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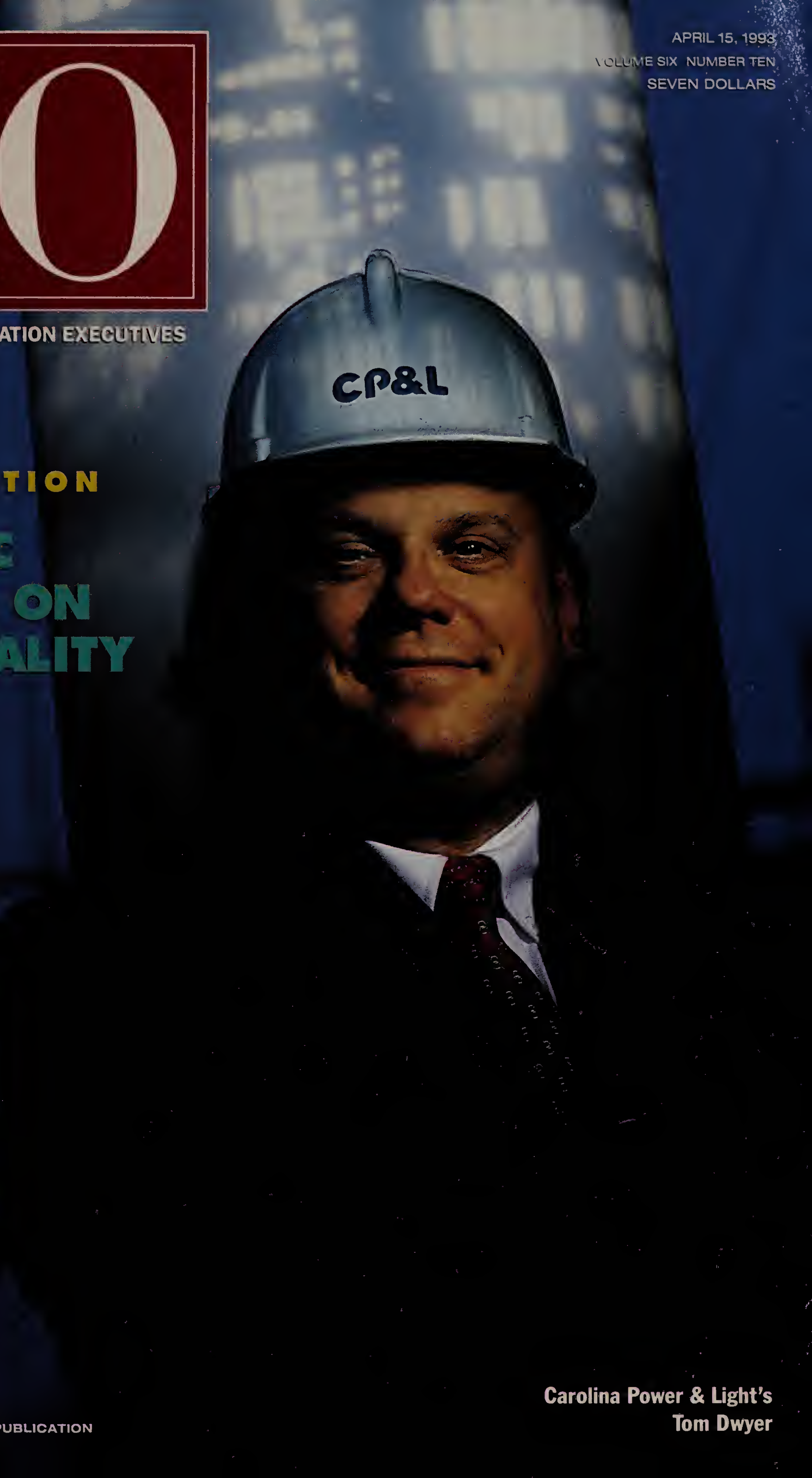

SPECIAL SECTION

STRATEGIC OUTLOOK ON TOTAL QUALITY

How TQM Plugs Into The IS Grid

Carolina Power & Light's Tom Dwyer

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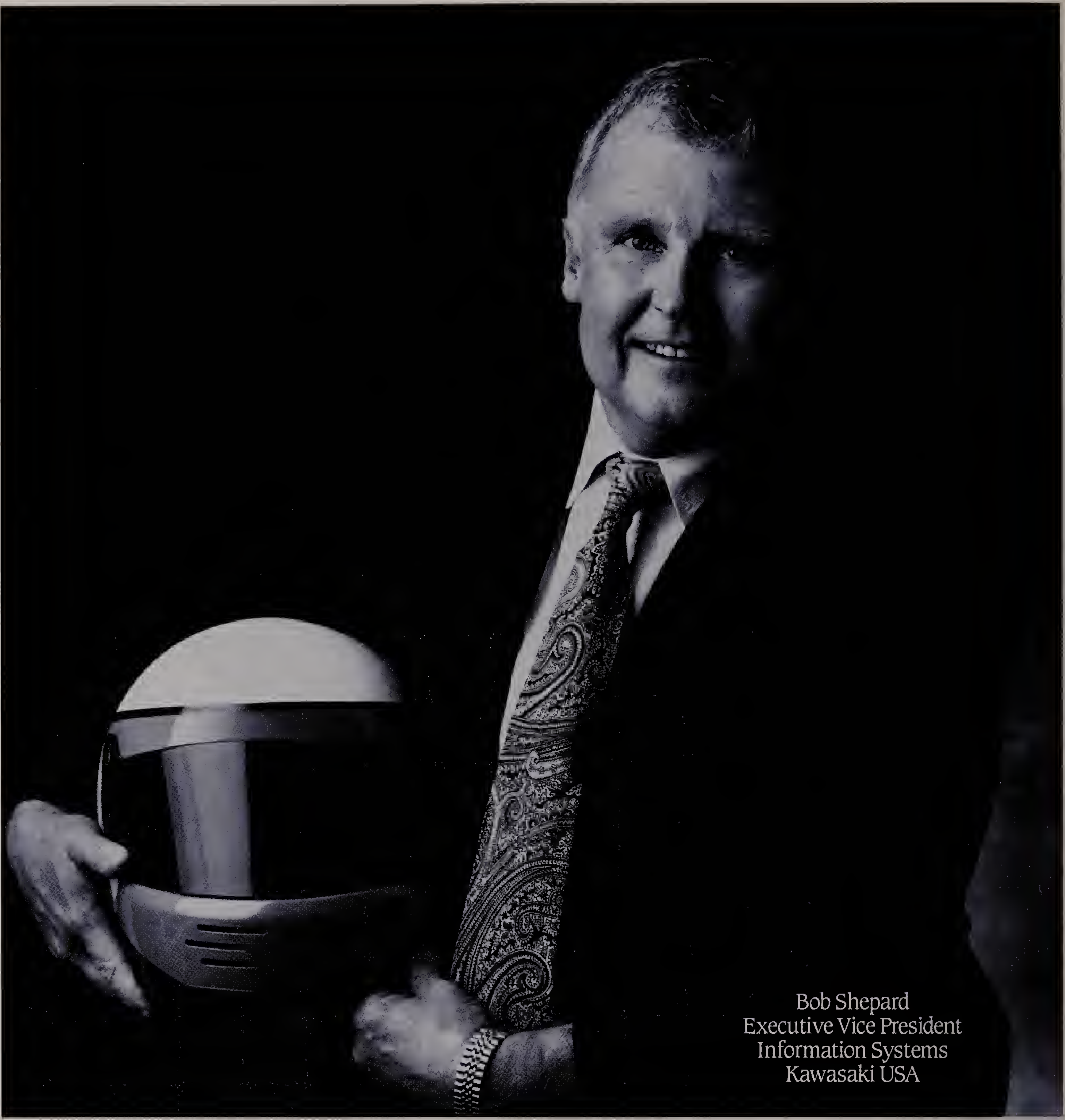

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Cover photo by Katherine Lambert

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Even without a corporate commitment to quality, IS executives can begin the quest for excellence by focusing on processes within their own departments.

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The IS dream house is a place where individual customer demands are recognized and met without sacrificing the overall goals of the organization.

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Small mutual-fund marketer Janus Capital faced the challenge of maintaining quality customer-service levels in the face of unexpected runaway growth. The IS department helped Janus pull through—at the same time becoming an integral member of the corporate team.

By Richard Pastore

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LETTER FROM THE EDITOR

PHOTO BY WEBB CHAPPELL

The Total Quality movement that many organizations are pursuing so vigorously today can be helped enormously by information technology. Our CIO-100 Special Issue on Quality in August 1991 showed an unmistakable tie-in between an enterprise's quality efforts and IT.

Unfortunately, many IS organizations have not yet been infused with the quality ethic. This is not because information executives don't care about quality; the lapse is related more to not knowing how to go about the task. Senior Writers Meghan O'Leary and Tom Kiely prepared this month's Strategic Outlook, "The House that Quality Built," beginning on Page 39. It presents several perspectives on what it takes to bring IS groups into the quality mainstream.

Executives hot on the quality trail concentrate on understanding the processes that are essential to the IT effort. That approach has credibility among the organizations studying the IS quality movement. Ernst & Young's Center for Information Technology and Strategy and the Society for Information Management are two organizations delving into the process approach to quality.

But attention to processes isn't enough. Successful quality efforts revolve around providing excellent customer service. Yet many IS groups can't even identify their customers or their customers' requirements. Complicating the situation is that both often change unexpectedly. In terms of IS best practices, this conundrum translates into the ability to be flexible, our quality-driven IS executives agree.

Creating effective cross-functional committees and benchmarking with other organizations are two valuable techniques for establishing the parameters of quality. Our profile of Carolina Power & Light Co. in Raleigh, N.C., details changes the IS organization had to make in order to push the company's TQM effort.

One caveat: An enterprise can have a great quality movement but still go broke if its strategic priorities are not on target.

Marcia Blumenthal

P.S. Response to our ESPRIT Awards has been enthusiastic. Remember, the application deadline is May 15. Guidelines and an ESPRIT Award application form follow Page 46. We welcome your application!

CIO

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LETTER FROM THE PUBLISHER

PHOTO BY GEORGE SIMIAN

Welcome to the world of Total Quality Management (TQM), the focus for this issue's Strategic Outlook section. Quality—and how it relates to the IS function—is a subject *CIO* routinely tracks and reports on to ensure that our readers are up-to-date on their peers' TQM initiatives.

As you know, the formation of teams to explore ways to improve the quality of processes and products is the basis for TQM. We learned when conducting our research for this issue that, interestingly, the membership of IS quality teams is extending beyond employees to include both internal and external customers and key technology suppliers.

One example is Fluor Daniel, an engineering and construction company based in Irvine, Calif. Bill Mazilly, the firm's vice president of information management, includes key suppliers such as Digital Equipment, Lotus Development and Novell on quality work teams. The technology suppliers work hand in hand with Mazilly's staff and customers to develop and deliver solutions.

Technology vendors' involvement in their customers' TQM efforts is a positive trend that can help create strong bonds and lasting business relationships. Vendors can bring fresh ideas and viewpoints to the table. They can also provide first-hand knowledge of new technology trends and suggest tactical products or services that might solve specific business problems faced by IS quality teams.

Coming In CIO

Buyers' Guide

Reengineering the purchasing process offers many organizations the opportunity to broaden and cement their relationships with suppliers and to understand their own internal relationships. *CIO* explores how three organizations approach the complex web of interactions that take a purchase from request to reality.

A Core Constituency

Following the infamous events of March 28, 1979, Three Mile Island's Unit 1 reactor was shut down for six-and-a-half years, and the company was approaching bankruptcy. Today TMI has rebounded, achieving financial solidity and safety levels that are among the best in the industry. A major agent of this comeback has been information technology.

On the Move

Portable computing has come a long way since the days of hefty laptops with hazy monochrome screens. And while analysts say the real potential of mobile technology will only be unleashed when portability is integrated with wireless communications, portable computers are already changing the way companies do business.

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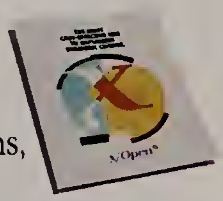

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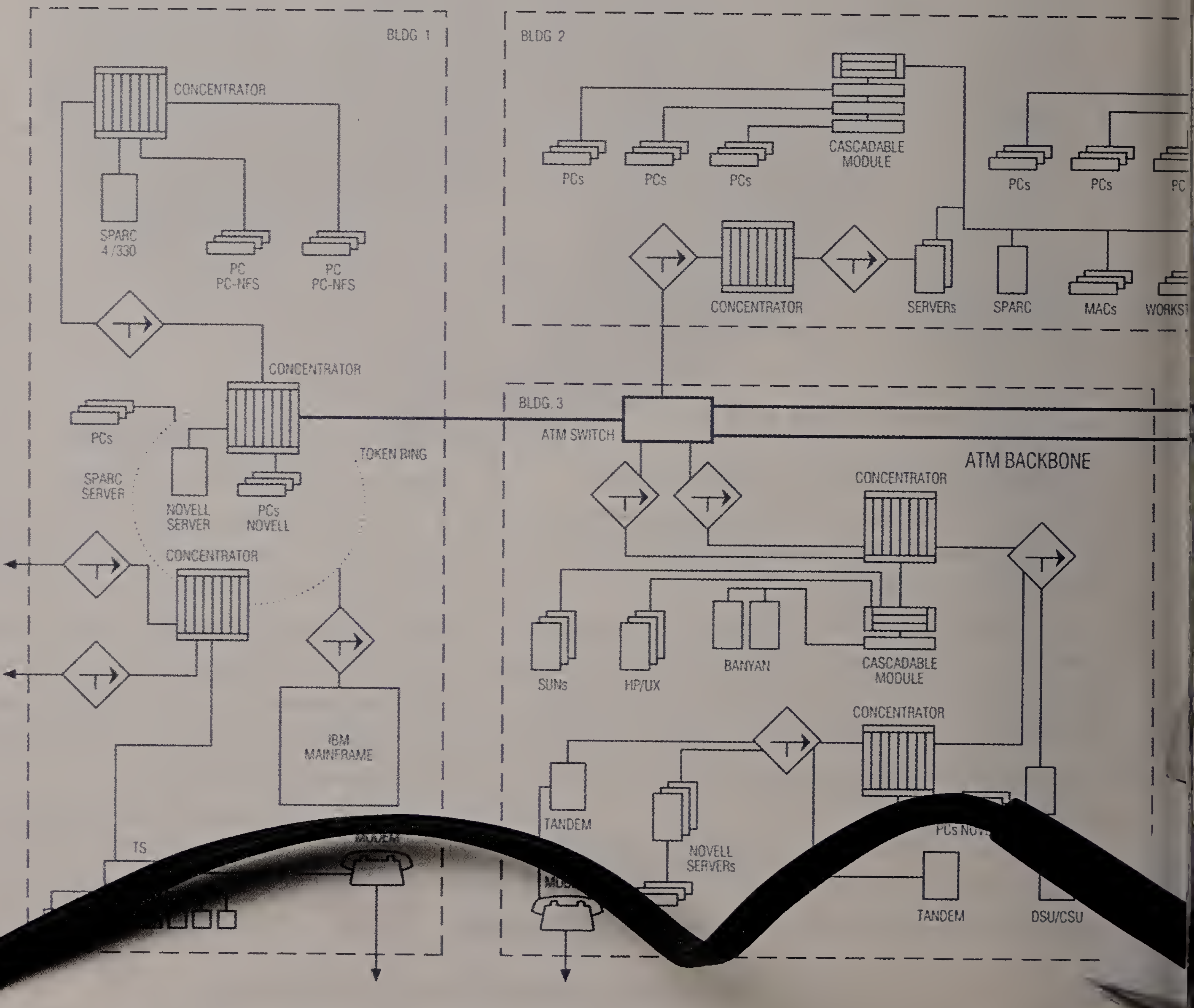

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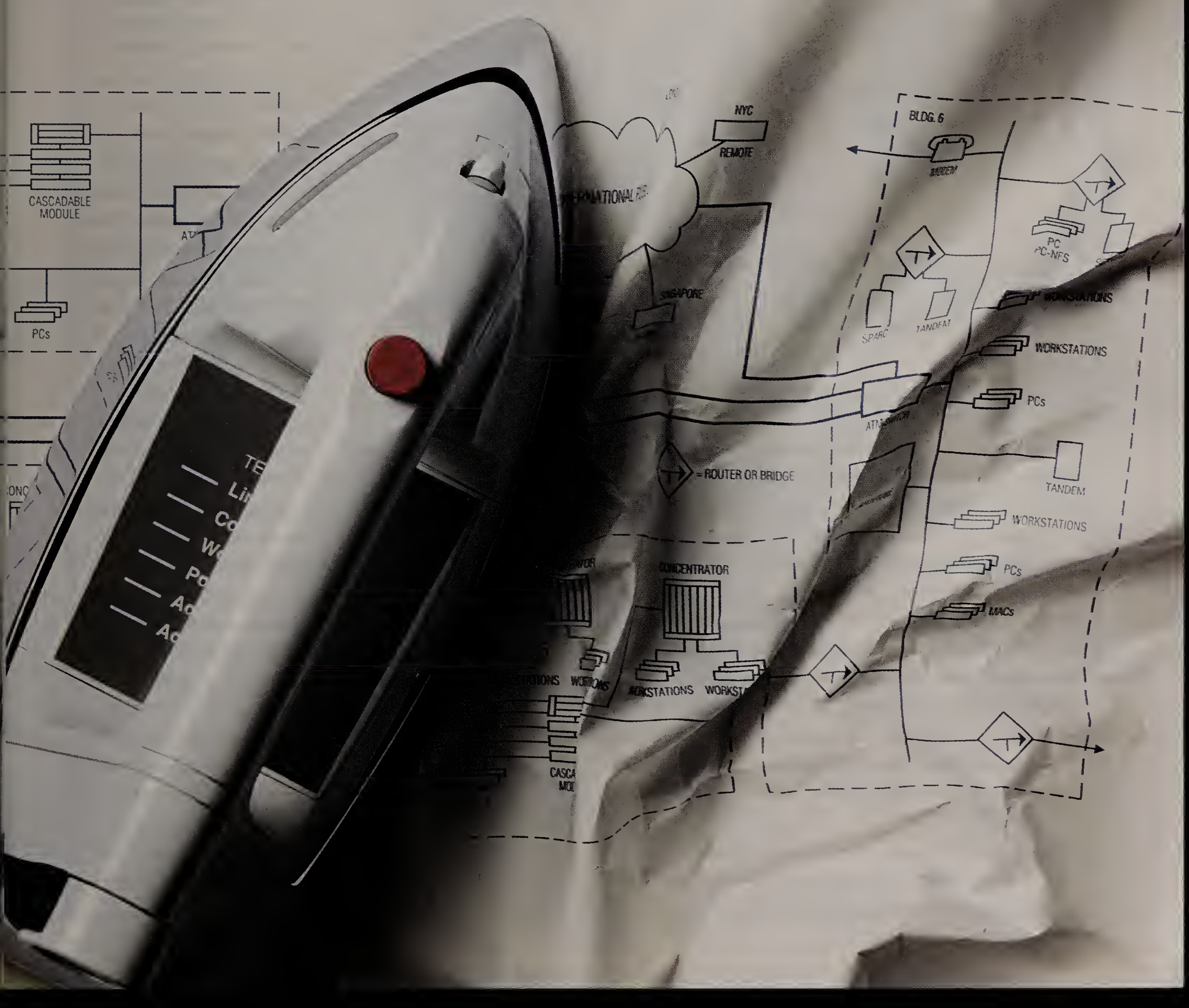

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COURTROOM TECHNOLOGY

AN ANIMATED PROSECUTION

If PC-based animation tools make headway into the criminal courts, Perry Mason may have reason to worry. In a handful of homicide trials in California and Florida, prosecuting attorneys will call to the stand computer-simulated reenactments of the victims' last moments.

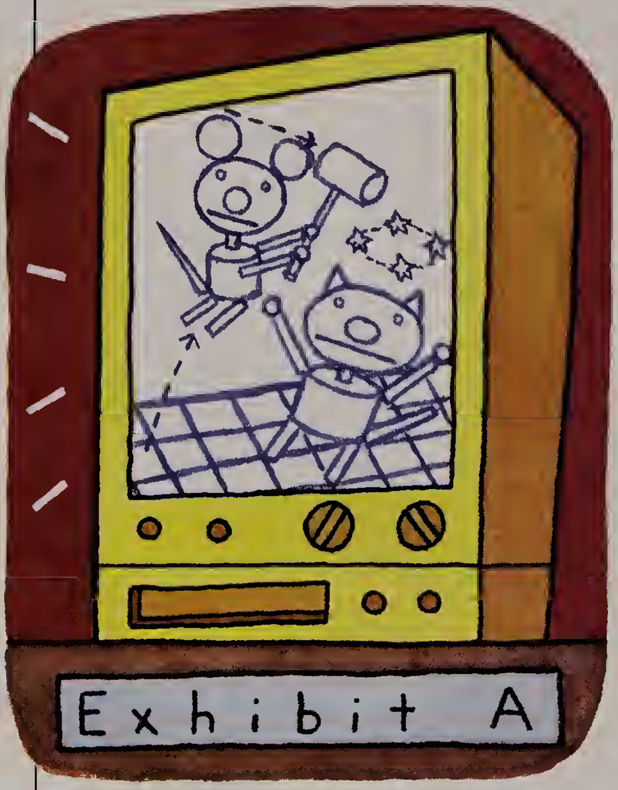

ILLUSTRATION BY JAMES KACZMAN

A judge in Broward County, Fla., recently ruled that the state could use animation to buttress its case against an accused hit-and-run driver. The defendant is charged with driving a pickup truck into a group of children and then fleeing the scene. A six-year-old girl died, and two other children were injured. The state's two-and-a-half-minute video renders the accident from four views: an overhead shot, a "chase scene" from behind the truck, the driver's view and, finally, the victims' view—in which the truck swerves off the road and bears down upon the viewer.

But aren't the final moments of the animation a tad sensational? "It is emotional," said John Suchocki, president of Eyewitness Animations, the Pompano Beach firm that made the computer presentation. "But the judge decided it was not unfairly prejudicial [to the defendant]. There is no speculation involved in the animation. It is a visual description of evidence compiled by [law-enforcement] investigators."

"Animations help to describe complex events," said Alexander Jason, a San Francisco-based ballistics expert who also creates these new legal tools. One of Jason's animations was used by prosecuting attorneys in a Marin County murder trial last year, another by the defense in a murder trial in San Bernardino.

"Animations have been used for years in civil trials, such as car crashes and airplane disasters," Jason said. (In fact, that is Suchocki's specialty: He is a former Eastern Airlines pilot, and his videos of accidents—such as the 1991 crash of a USAir flight in LosAngeles—have been broadcast on television news shows.) But the software and hardware needed to make such animations have always been too expensive for criminal trials—until recently. "A district attorney would not touch animations that were costing $75,000 to $100,000," said Jason. Now the animations can be created on PCs—both Jason and Suchocki use 486-based machines and animation software developed by Autodesk Inc., of Sausalito, Calif. "The costs run between $5,000 and $20,000," Jason said, "and that's affordable." ■

APPLICATION DEVELOPMENTS

In what may be a little remedial office automation, college administrators now have a tool that will allow them to offer electronic applications to prospective matriculants. Application Manager, from LAM Technologies Inc. of McLean, Va., offers a template that allows schools to customize diskettes with their application forms and other pertinent information, such as due dates and courses offered.

An application processor automates the collection and processing of data from completed applications returned via mail or modem, thus eliminating much of the time-consuming administrative work involved in manual applications. The company estimates that it takes only 30 seconds to process an electronic application, compared to more than five minutes for a written form. In addition, it claims that electronic applications are easier for students to fill out, especially when it comes to making corrections and writing essays.

The package will also allow colleges to include customized "view books" of campus pictures and the school logo, printable recommendation forms and information about student life. ■

A CAPITAL SUGGESTION

Hey, President Clinton, here's a deal: Enact an investment tax credit this year, and CEOs will go on a capital-equipment buying binge. That's one message that came out of a survey of 300 CEOs and other top corporate officers of mid-sized publicly held industrial and service companies.

Respondents to the Ernst & Young survey clamored for tax incentives that encourage investment. If Washington can push through a 10 percent broad-based investment tax credit pronto, 56 percent said they will boost capital spending "significantly" this year. Absent that (and if capital spending is based solely on corporate needs), only 14 percent will increase spending in 1993. In addition, seven out of 10 CEOs advised Clinton to focus on deficit reductions and business tax incentives first—they consider government spending on infrastructure or job training to be pale solutions for creating a favorable business climate.

Capital-gains tax reductions got a thumbs-up from 62 percent of the executives, but urban enterprise zones received a yawn—only 12 percent said they would locate a business facility in a depressed area in return for tax breaks. "The surveyed executives agree with Clinton's approach—that we need both deficit reduction and economic incentives—but they ask him to look at a strong investment tax credit to stimulate growth," said Mary Frances Pearson, an Ernst & Young tax partner. ■

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TRAFFIC MANAGEMENT

TAKING THE STOP OUT OF STOP AND GO

The hit film *Falling Down* begins when an irate citizen stuck in traffic abandons his car and embarks on a crime spree. The film's message has something to do with America's shattered psyche. But there's a lesson in here for transportation officials as well: It's important to keep commuters happy.

As part of a plan to improve driving conditions in and around Boston, the Federal Highway Administration and the Massachusetts Highway Department recently launched SmarTraveler, a computerized system that allows residents to receive up-to-the-minute, location-specific traffic and transit information by calling a single number. Using a menu, someone with business at Logan Airport, for example, can find out whether to expect delays in the Callahan Tunnel.

Traffic information is updated as callers use the system, with data gathered by land, air and closed-circuit camera surveillance. Stephen P. Crosby, chairman of SmartRoute Systems, the Cambridge, Mass., firm that designed SmarTraveler, said that the service has been receiving thousands of calls a day, with volume particularly heavy during snowstorms.

Weather is less of a problem in Atlanta. But with a Super Bowl and Summer Olympics in its future, that city, too, is worried about gridlock. Scientists at the Georgia Tech Research Institute are approaching the problem with a neural-network system that allows planners to move traffic quickly. TERMINUS (Traffic Event Response and Management for Intelligent Navigation Utilizing Signals) may be incorporated into an advanced traffic-management system being built in Atlanta by TRW Corp.

TERMINUS has three components, according to the magazine *Research Horizons*. A traffic simulation of the area around the Atlanta-Fulton County Stadium demonstrates options for coordinating signal lights, a graphics interface creates a visual representation of the simulation, and a neural network synchronizes the lights based on data collected by sensors. The system analyzes traffic flow, including the number and speed of vehicles on different road segments, and calculates how many cars can be moved from parking lots to a nearby highway. ■

A CATALOG OF VIRTUES

While L.L. Bean may generate business by hawking purple Gore-Tex anoraks in four-color glossy catalogs, your average valve-distributor doesn't really need such an elaborate presentation. For this crowd, and for retailers, wholesalers and manufacturers who want to market directly to their customers without the hassle or expense of producing and updating a catalog, there is Market/Net from the Information Clearinghouse Inc. in Rancho Dominguez, Calif.

Market/Net is a software package that allows users to put product catalogs online. Customers can browse and order directly via PC; they can even create customized catalogs of items they order frequently. Since prices and product lines can be changed instantly, the catalogs are always up-to-date.

Market/Net's creators claim that their product can be tied easily into a company's existing order-entry, billing and warehousing systems, and they predict that it will slash companies' sales costs, increase sales volume and promote customer loyalty. Electronic catalogs could eliminate sales forces entirely for small companies and extend business to 24 hours a day. And think of all the extra room in your mailbox. ■

ILLUSTRATION BY FRAN O'NEILL

WAITING FOR THE BIG WAN

Information executives might think they have their hands full today with their companies' LANs. A recent survey from the Business Research Group (BRG), in Newton, Mass., however, suggests that they should also be thinking about tomorrow, when the increase in data traffic over wide area networks (WANs)—driven by the growth of bulk data/file transfer, imaging applications, videoconferencing and LAN-to-LAN connections—changes the complexion of telecommunications technology.

BRG's conclusions are based on interviews with 250 IS and telecom managers from companies in six different industries with telecommunications budgets of over $10 million. Eighty percent of respondents said they expect the volume of their WAN data traffic to increase over the next two years, perhaps by as much as 20 percent. They also expect the traffic to become denser in this country and to expand internationally.

As data traffic increases, BRG concludes, customer demands for greater speed and increased capacity will spur telecommunications carriers to develop new, initially expensive enabling technologies. Data traffic will move to a hybrid public/private-network environment, as voice traffic has done. Ultimately, intelligent networks will evolve, comprising frame-relay (a fast-packet technology) feeders supported and connected by large asynchronous transfer mode-based backbone networks. ■

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CIO CONFERENCE

THE VIRTUES OF VIRTUALITY

Arizona's high desert near Tucson is the last remaining home of the remarkable—and endangered—saguaro cactus, that statuesque stovepipe variety that grows as tall as 40 feet, lives as long as 200 years and often sprouts arms that appear to be raised in surrender to Wyatt Earp.

The prevailing message to the 450 attendees at last month's "CIO Perspectives" conference, held amid the saguaros at Tucson's Westin La Paloma Resort, was that if they're not ready to take the initiative in helping their endangered organizations become real-time, quick-response, "virtual" opportunists, they should stick up their hands right now and go quietly to the hoosegow.

Speakers put considerable emphasis on the fatal error of applying technology to solve the wrong problems. Bill Davidow, author of *The Virtual Corporation,* whose thesis is that organizations will only survive if they can continuously reshape themselves to fit their customers' shifting needs, told of how he had once created a sophisticated system to measure the defect rate at his employer's manufacturing facility. Not long after implementing the system, Davidow visited a Japanese competitor's plant where no such system was in place. He figured they had to be pretty backward. But when he asked to see figures on the plant's defect rate, he was shown instead a baggie containing two parts. "That was the month's total number of defects," Davidow said. The plant didn't need a fancy defect-tracking system because it hardly made any mistakes.

Conference moderator Jim Wetherbe declared that networks have fundamentally changed the way we must do—and organize—business, and he stressed that people should be regarded as intelligent nodes of the corporate network and freed to behave accordingly. "The problem with bureaucracies," he said, "is that they exist to prevent people from making [the kinds of] $25 decisions" that end up costing exponentially more as they filter through the byzantine chains of command. To overcome this requires non-hierarchical, team-based organizations. Wetherbe presented a case study of the transformation of IS at an unnamed company, in which the hierarchical power structure was demolished in favor of cross-disciplinary teams. This initially infuriated the former hard-charging top dogs (two of whom left immediately) and unsettled the troops, who chafed about taking on the "extra" duties of managing themselves. However, the long-term results have been dramatically higher IS self-esteem and a corresponding improvement in its enterprisewide reputation.

What's more, said Wetherbe, IS has since been asked to teach team techniques to other departments. "Just think of it: Other functional managers coming to IS and saying, 'Tell us how to manage.' "

Keynote speaker Joel Barker took a futurist's perspective, urging participants to be intrepid "paradigm pioneers" rather than safety-seeking "settlers." Barker, an author and consultant who coined the expression "paradigm shift," said that pioneers encourage and appropriate unconventional ideas from unorthodox sources, are willing to break rules and possess the courage to act on incomplete information. He noted that while the United States has been responsible for creating most of the paradigm shifts in the last 40 years, it is the Japanese who have run with the new concepts.

"When a paradigm shift occurs, everyone goes back to zero," said Barker. "The only way to protect your assets is to move forward fast." Using the model of the Sony Walkman, Barker explained that success in the 21st century will belong to those companies that combine paradigm pioneering with the incremental improvements of Total Quality.

Two speakers who de-

CONFERENCE ATTENDEES *(above) network against the backdrop of Tucson's Santa Catalina Mountains; moderator* **JIM WETHERBE** *(left) interviews keynote speaker* **JOEL BARKER**; *a book signing for Barker's* Future Edge.

PHOTOS BY DAN SNYDER

CAREER MOVES

Avis Rent A Car System Inc. announced the appointment of NICHOLAS O'CONNOR as director of systems development with responsibility for all the company's computer-driven sales and marketing programs. O'Connor, who joined the Garden City, N.Y., company in 1972 as a production controller, has been instrumental in developing information systems for Avis's sales and marketing programs.

PETER A. MIHALTIAN has been appointed executive vice president and CIO of Belk Stores, a multibillion-dollar retailer headquartered in Charlotte, N.C. Mihaltian assisted the organization as a technical adviser and consultant during the company's six-year systems design and programming project.

Former Frito-Lay CIO JAMES JURACEK has been hired as senior vice president of research and development for BMC Software Inc. in Sugar Land, Texas. Before joining Frito-Lay, Juracek was vice president of systems engineering for Sabre Computer Services.

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plored organizations' failure to capitalize on their assets suggested different approaches to exploiting that portion of the iceberg which too often remains invisible. Howard Rubin, a professor at Hunter College of the City University of New York, described a study showing that fewer than 20 percent of companies know the size of their software asset base, and fewer than 3 percent know how much their portfolio changes year to year. He recommended benchmarking as a way to uncover these hidden assets.

Leif Edvinsson, of the Skandia Group in Sweden, agreed that many companies fail to make the most of their assets; but he was concerned less with IT dollars than with intellectual capital. Skandia has concentrated on capturing these assets—which Edvinsson described as professional and organizational knowledge and commercial skills—and transporting them to its globally dispersed business units.

The message that emerged from a panel of human-resource experts is that passivity and myopia are the two greatest impediments to ambitious IS executives. Nielsen Marketing's David Robino recommended that CIOs and prospective CIOs "demonstrate that you're not interested just in technology but in the bottom line. Then they won't just save you a place at the table: They'll hold the meeting for you."

Jim Stikeleather described Kash n Karry Food Store's New Architecture Project, an ambitious effort to develop technical and information architectures that would allow the company to reengineer itself. And marketing consultant Regis McKenna warned companies against taking customer loyalty for granted in a world where product and service choices are proliferating rapidly. As society has grown factionalized and better informed, he noted, "management must have one foot in technology and one foot in the marketplace."

A CHANGE IN DEMAND

Consider the fickleness of senior executives. At the behest of upper management, CIOs spent the last few years learning to become strategic thinkers. Now, IT search consultant John J. Davis reports that senior managers have changed their expectations when it comes to filling the vacant IS executive spot.

"In the '80s, companies wanted CIOs who were strategic visionaries, but today they seek bottom-line performers," said Davis, who heads the New York firm that bears his name. As a result, the CIO candidate of five years ago might be hard-pressed to land a position in today's market.

Candidates must possess a mix of the qualities that are reflected in job specifications for open CIO positions. "The current emphasis," Davis contends, "is on how technology in specific terms can help other functions." CIO candidates are expected to have a history of involvement in day-to-day activities, a bottom-line approach to replacing antiquated technology, mastery of team-building and people skills, and proficiency in communicating across all levels of the organization. According to Davis, senior-level IS employees who can satisfy these changing requirements will find an improving job market this year.

BRAIN-WAVE COMPUTING

THOUGHTS THAT COUNT

No, we aren't all driving around in floating solar-powered cars. No, we can't add water to a tiny pill and produce a steaming plate of chicken fajitas. But another 1950s starry-eyed prediction of the future may be approaching reality, albeit with baby steps: Human electric brain waves are controlling computers all across the globe, according to a recent report appearing in *The New York Times*.

ILLUSTRATION BY JAMES KACZMAN

Japan: Nippon Telegraph and Telephone Corp. researchers are using brain waves to determine in which direction someone will move a joystick—before they actually move it. Similar research has been conducted in Austria.

New York: A New York State Department of Health research team has trained subjects to use their brain power to move an on-screen cursor up and down and to the left and right.

Illinois: Psychologists at the University of Illinois have devised a system that allows subjects to spell out words on a computer screen at a rate of 2.3 characters a minute just by thinking each letter.

Many of these experiments use electroencephalography—in which electrodes are attached to the subject's scalp—to collect electric brain signals and relay them into computers. The computers monitor the signals and act either on a single signal or a pattern of similar signals. Among the brain waves being tapped are "mu" waves, rhythmic electrical emissions from the brain's sensorimotor center. Researchers hope to develop more sensitive sensors to pick up on the brain's faint magnetic fields, which would provide greater detail than electric waves.

One of the first experiments in brain-wave computer control took place in the U.S. Department of Defense, beginning in the 1970s. A goal of this discontinued "biocybernetics" research was to enable a computer to read the state of mind of fighter pilots in order to better aid them in controlling their planes.

Today, the technology is being used primarily in aiding the physically handicapped.

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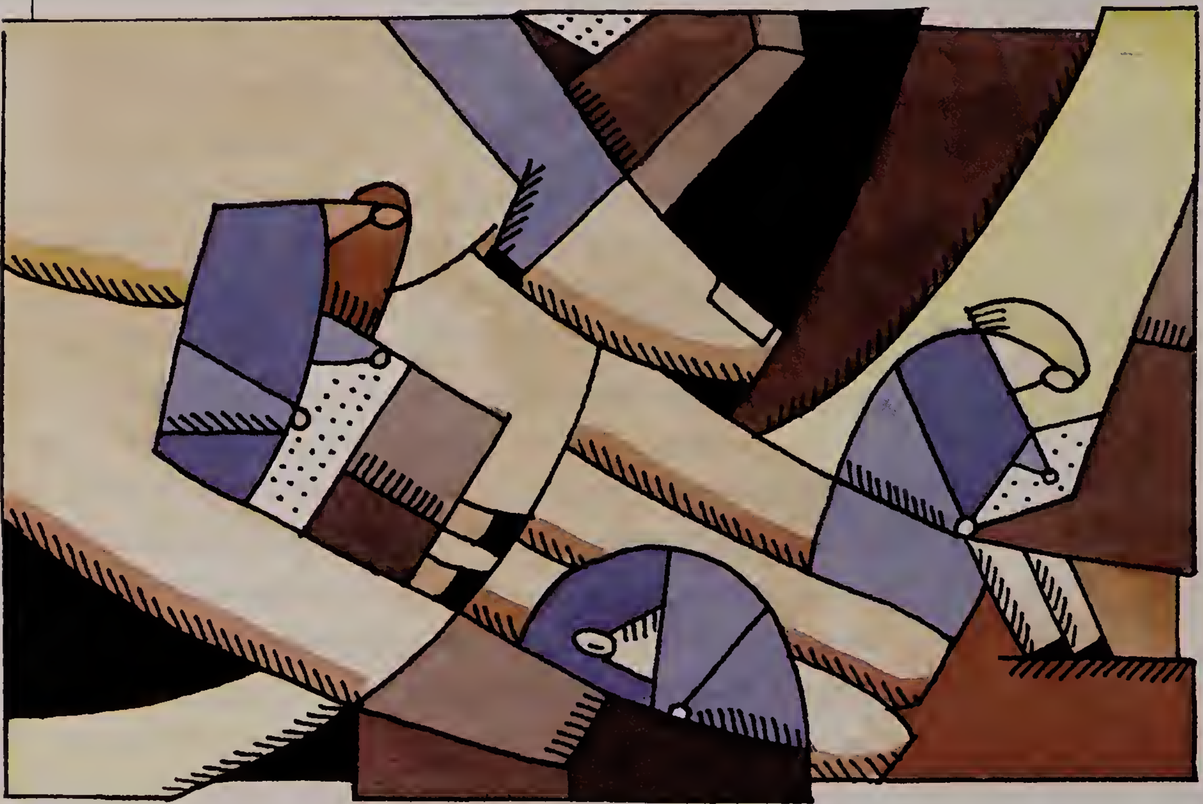
Micro Management

Better management control and more-targeted training offer the means to end-user effectiveness

BY JOHN P. HALLORAN AND BRIAN S. PAPPAS

Companies are increasingly dependent on and investing in end-user computing. However, current end-user-computing management practices are inadequate, and the introduction of client/server and groupware applications in today's end-user environments only increases the imperative to improve them. Until concrete steps are taken, the situation promises to grow worse. Companies must do a better job of measuring and understanding their current end-user computing environments as a prerequisite for developing new management strategies.

Nolan, Norton & Co. recently led a six-month study of end-user computing at 10 major U.S. organizations, including AT&T Bell Laboratories, CIGNA Corp., Ford Motor Co., Harvard University and Xerox Corp. The study looked for ways to better measure, manage and gain businesswide benefits from end-user computing. Like most companies, the participants were concerned that their years of technology spending might not be paying off and that the issues raised by computing empowerment—infrastructure, ownership, roles, data access and control—presented them with new management challenges.



One major conclusion of the study was that companies are spending much more on end-user computing than they realize. Nolan, Norton found total annual spending per PC/workstation to be as high as $20,000. This figure included not only the visible costs typically accounted for in IS budgets (hardware, software, IS support) but also the unbudgeted, hidden costs (time spent by coworkers supporting the environment and helping each other solve computing problems). While annual spending on technology and IS support personnel ranged from $2,000 to $6,500 per PC/workstation, these hidden costs—which companies rarely measure—can add $6,000 to $15,000 per PC/workstation. Attempts to save money by containing or reducing IS support for end-user computing often result in this responsibility—and its associated costs—shifting to the user community, where support levels usually are adjusted to meet demand.

To date, investment in end-user technology has most often been justified on the basis of personal-productivity improvements. But this focus is shifting to the business process, where much greater benefits are possible.

Local area networking is growing faster than PC penetration, and business users are driving the demand for integrated information-management capabilities that transcend individual computing (for example, the accessing and sharing of data across applications, locations and organizational structures).

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When viewed from the traditional IS perspective, the end-user environment often appears unmanaged and out of control. The study found that on average, end-user-computing management practices are less than 35 percent effective, based on the Nolan, Norton management-practices scoring methodology. By comparison, management practices in the traditional host environment, based on previous Nolan, Norton studies, are more than 80 percent effective.

Interestingly, no correlation between satisfied users and effective management practices was found. But management effectiveness did rise with user expertise, reinforcing the relationship between high demand and high quality. Historically, most users have taught themselves and each other to use end-user technology. Organizational assistance, such as classroom training, is less effective than local, focused, "just-in-time" shots of training. More important, the technical training (Which keys do I press?) must be augmented with broader education (How is this technology relevant to my business process?).

A group of divisional IS directors recently spoke of a user who built an exceptional PC application to be used by others in similar functions throughout the company. They repeatedly described this user as "dangerous" and used the word "risky" to describe the situation that such users create for the organization. Risky, yes—dangerous, no. Users with a strong understanding of the business process, a powerful PC and the right tools are the computing heroes of tomorrow. The risk comes when enthusiastic users meet slack management practices. IS must build and deliver the infrastructure that enables business users to push the edge of the envelope with minimum risk to the corporation.

Because the bulk of a company's investment is in people time, strategies for instituting benefits and reducing costs should focus on how employees operate and support the end-user environment. IS should concentrate on "making it work," while business management should emphasize "using it effectively."

> *It is important to optimize IS and peer support through the right mix of central staff and local experts, and to identify the necessary mix of skills and job descriptions.*

IS can also have a positive impact on the cost/benefit picture by viewing the personal technology interface as the new center of the computing universe. As the number of tools in use and the need for integrated capabilities increase, the personal technology interface will become more complex. Since user effectiveness begins with the interaction between a human being and a piece of technology, IS must build and design the functional and technical infrastructure from the interface back, focusing on consistency, reliability, speed, look and feel, and feedback. Interface effectiveness should be a formal quality measure.

A common problem in supporting the end-user computing environment is the lack of formally defined services and service-level agreements. When support resources and user expectations are not well-managed, the environment degrades into a reactive free-for-all. The study found that nearly 75 percent of IS time was spent in operations support, often to the detriment of planning, research and management activities.

Defining end-user services and their accompanying goals and performance measures is an education for everyone. Users often want only components and do not care about security, backup/recovery or the nuts and bolts of LAN/WAN interface problems. Services must be defined and sold in terms meaningful to the business.

IS should focus on what users really care about. When implementing services, it is important to optimize IS and peer support through the right mix of central staff and local experts, and to identify the necessary mix of skills and job descriptions. Peer-support roles should be formalized, improving end-user computing within the processes of the business. This means making better use of local experts to deliver more timely and effective training and education. It also means identifying and leveraging innovation across the business and focusing on process-improvement possibilities. IS executives should assume that only 20 percent of users will naturally employ end-user computing capabilities to achieve better business results; the other 80 percent will need direction and assistance.

In a very short period, we have seen end-user computing shift from the personal to the interpersonal. Whereas personal computing delivered incremental benefits, interpersonal computing has the potential to deliver breakthrough benefits for the organization.

The time is right for many organizations to move to new levels of effectiveness in managing end-user computing. To create a world-class environment, organizations must develop an enterprise view of the end-user computing infrastructure, define and deliver a broad spectrum of end-user services, improve the individual utilization of these technologies and translate these activities into process-oriented business capabilities and benefits.

These are the critical success factors for building end-user computing environments that facilitate organizational productivity, business-process efficiency and, ultimately, company profitability.

John P. Halloran is managing principal and Brian S. Pappas was formerly a senior manager at Nolan, Norton & Co., a Boston-based consulting firm specializing in the strategic use and management of IT.

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Informed Opinions

Four CIOs bring their frontline perspectives to a survey on the state of IS

BY KATHRYN HAYLEY AND JEFF PLEWA

What happened last year in North America's IS departments, and what do information executives envision for the future? Each year, Deloitte & Touche Management Consulting group seeks to answer that question through its survey of U.S. and Canadian CIOs, "Leading Trends in Information Services." Last January, as the responses of the 534 participants in 1993's survey were being tabulated, Deloitte & Touche Information Technology Consulting Principals Kathryn Hayley and Jeff Plewa, along with *CIO* Editor Marcia Blumenthal, met with four Chicago-area CIOs to discuss the preliminary findings. Participating in the forum were Gordon Kerr, senior vice president of MIS for Hyatt Corp.; Michael Roche, senior vice president and CIO at Heller International Corp.; James G. Schoebel, vice president of systems, operations and telecommunications for Health Care Service Corp. (HCSC); and Daniel Dvorak, vice president of MIS for Pepsi-Cola General Bottlers Inc.

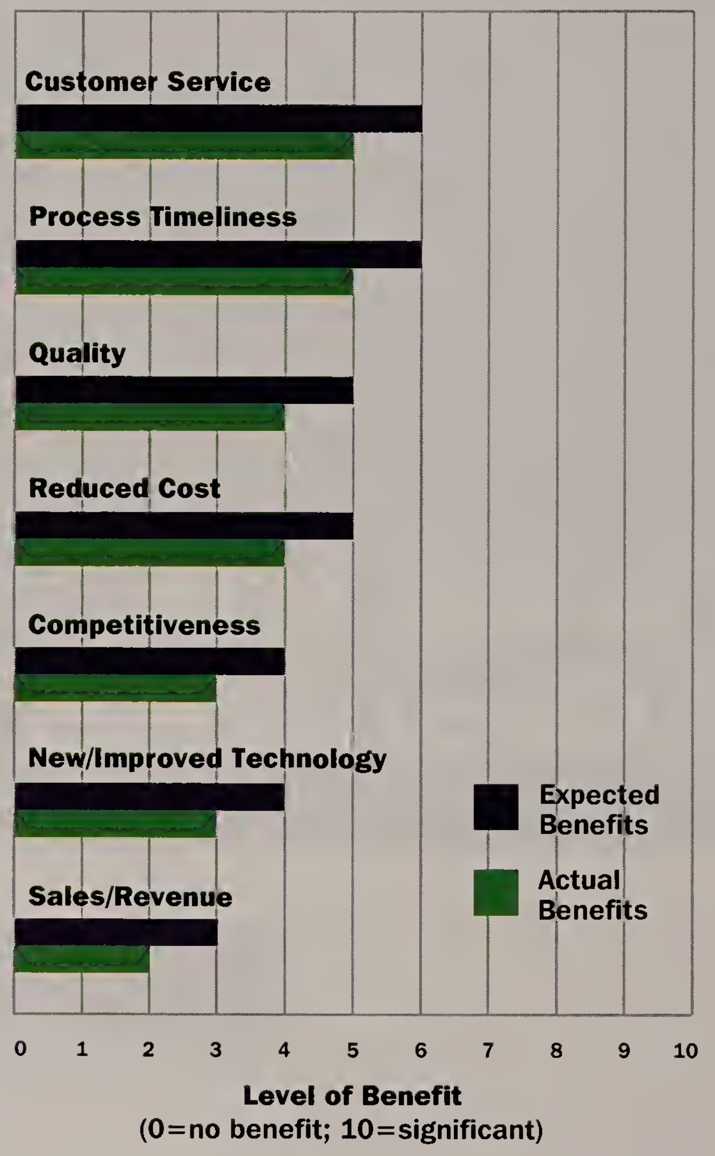
The most pronounced trend uncovered by this year's survey is the dramatic increase in the number of business-reengineering projects underway. IS executives reported an average of 4.4 projects per company in 1992, up from 1.6 in 1991.

But are companies really radically redesigning what they do or just applying the reengineering label to ordinary business-improvement efforts they've always made? The answer, according to Kerr, is a little of both: "Some businesses are really reengineering; some are just trying new ways to make their businesses work better." Kerr defines reengineering as "totally changing the way a process works—not just internally but externally too—so the customer sees dramatic changes."

"A lot of people are doing business improvement and wanting to call it reengineering," agreed Roche. "But reengineering is different. It's a philosophical change leading to a dramatic breakthrough—it questions almost everything done in a particular function and asks, 'Why do we even have this function?' "

Nevertheless, many businesses are doing "real" reengineering—and getting results that make customers happy. Schoebel said that HCSC has reengineered the customer-inquiry function in its claims department so

Benefits of Reengineering



While respondents indicated that the actual benefits received from business reengineering are often less than expected, they rated customer service as one area where significant results were achieved. "If you look at it from the customer's perspective... you get little shocks of recognition," said Gordon Kerr.

CHART SOURCE: DELOITTE & TOUCHE

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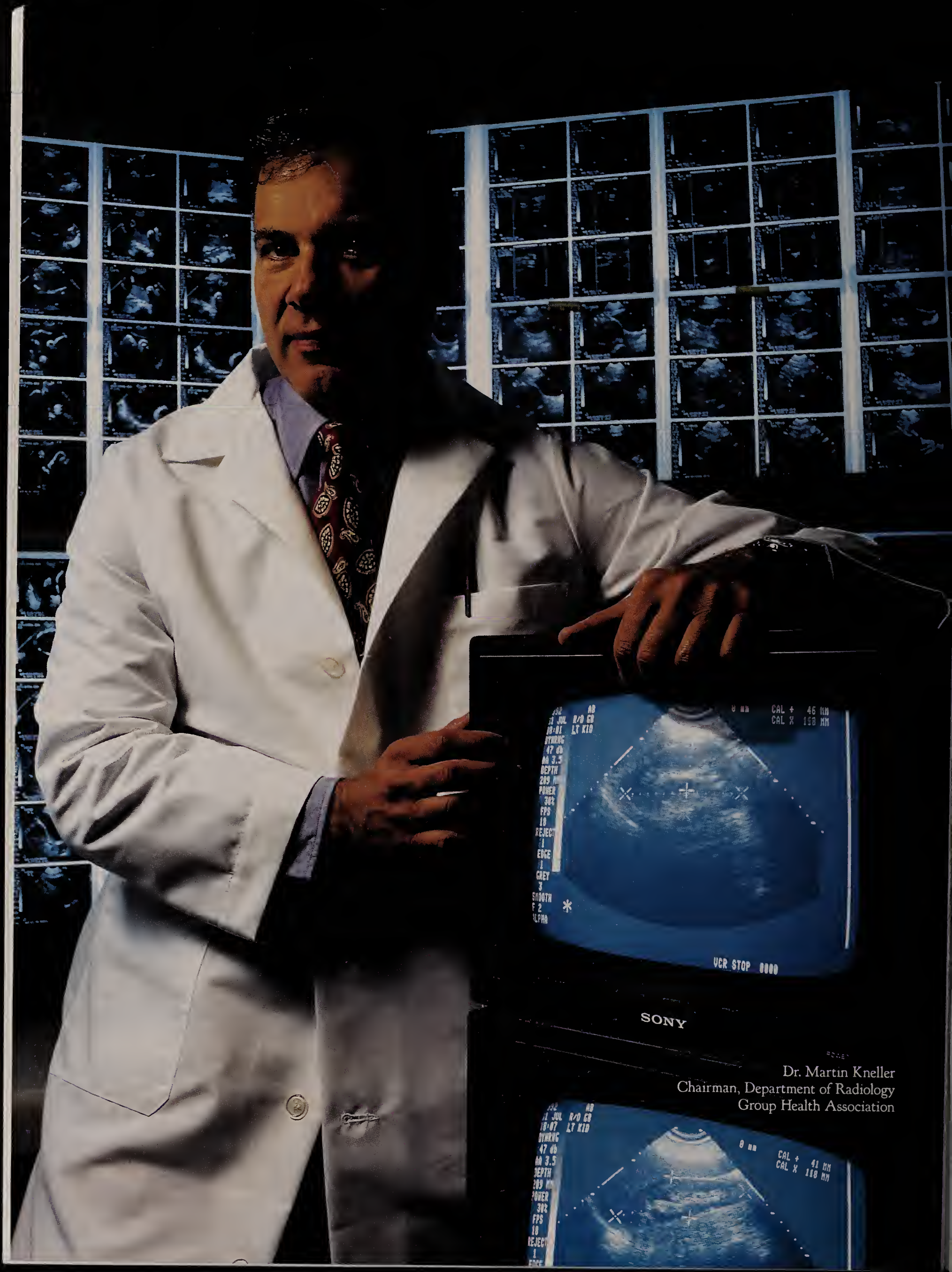

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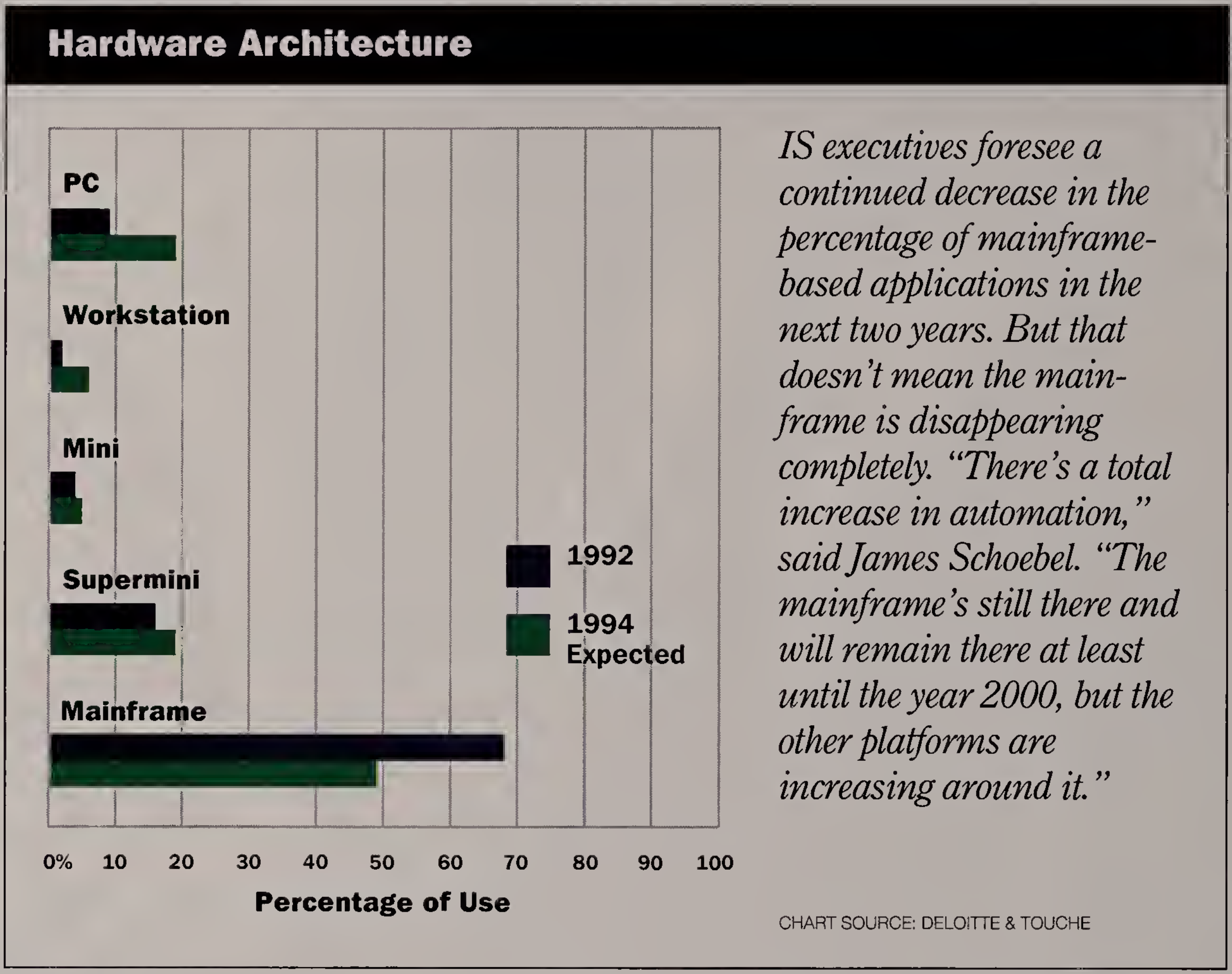
that in 99 out of 100 cases, customers get an answer from the first person they speak with. "Just think how you feel when you pick up the phone to ask about a claim," he said. "Your gut feeling is, 'They're going to put me off or tell me they'll call back later.' But in almost every case, we can give an answer right away. That's a big improvement from the customer's perspective."

Many IS executives have had similar experiences: The survey found that better customer service is one of the most widely acknowledged benefits of reengineering. In fact, the best way to start a reengineering project, said Kerr, is to look at the business through the customer's eyes. "If you look at it internally and ask, 'How can I reengineer some department?' you tend to do top-down reengineering that no one wants. You go to the department and say, 'OK, I've reengineered your department; here's your application.' And they say, 'Yeah, well fine. So what?' But if you look at it from the customer's perspective and ask, 'Why am I being asked to stand here while a clerk fills out forms?' you get little shocks of recognition and discover that it really doesn't make sense."


Hardware Architecture

IS executives foresee a continued decrease in the percentage of mainframe-based applications in the next two years. But that doesn't mean the mainframe is disappearing completely. "There's a total increase in automation," said James Schoebel. "The mainframe's still there and will remain there at least until the year 2000, but the other platforms are increasing around it."

CHART SOURCE: DELOITTE & TOUCHE

Kerr said Hyatt took this "outside in" approach to rethinking the check-in process. "[We] eliminated all the paper processing," he explained. "Now, you give us your credit card, we slide it through the reader, and you're checked in."

For all the good results of reengineering, the survey also found that most CIOs' expectations for such projects had gone unfulfilled, with profitable companies reporting somewhat better results than unprofitable ones. What makes a reengineering project live up to its billing? Dvorak believes that "success or failure is directly related to the buy-in you get at the department level when you embark on the project." And the business process, not the technology, must drive the effort. "Some of these reengineering projects could have been done even without advanced technology," he said.

Mainframes: Decline Expected

While the average company now runs nearly 70 percent of its applications on a mainframe, IS executives predicted that that percentage will decline to less than 50 percent in just two years. Part of the motivation to move to smaller platforms is cost, since smaller platforms require less operating staff. But other factors are at work as well.

Roche says the movement is driven by a change in the way computers are used. "In the financial-services industry, you find that most of the older systems were mainframe-oriented, but they were also back-office systems," he said. "Now the staff using the new applications are degreed professionals. The systems we build for them are more easily integrated into their desktop machines, and the tools in that environment are better for what they do."

But mainframe applications aren't disappearing completely. As Schoebel put it, "There's a total increase in automation. The mainframe's still there and will remain there at least until the year 2000, but the other platforms are increasing around it." When Schoebel put together his flagship claims-processing system about eight years ago, "we didn't have complete confidence that the new technology would sustain itself," so he invested in a mainframe-based system. Results have been good, but for new applications his strategy is "to look first at platforms other than the mainframe. It's mainly a matter of cost."

Kerr describes the trend in slightly different terms. "Instead of looking at how to cram more onto one box, we're looking at the size of the new application and selecting a box that matches, one application per box," he said. "Then we plug the box into Ethernet, and our people have access to that application, or we can combine it with other applications."

The need "to scale the machine to the application" was an important reason for Pepsi Bottlers' adopting a Unix operating environment, according to Dvorak. "Coding everything in a Unix-compliant language opens all kinds of avenues, and with intelligent networking you maintain the data integrity you need in a multiprocessor environment."

The increased use of networks and

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distributed computing might suggest that IS executives are interested in open-systems standards. But the survey found that as many as 40 percent are not even considering open systems. Part of the hesitation in this area may stem from the fact that CIOs don't yet see open systems as a reality. "From the standpoint that open systems imply easy connectivity and integration of components—I haven't seen it," said Roche. "In my experience, so-called open environments are no easier to work in than other environments we've employed." The standards aren't there yet either. Roche pointed out that as recently as 1992, "we set up competing standards for something as basic as E-mail."

Schoebel added that so far he hasn't gotten a lot from standards beyond procedural languages. Too often, he said, standards and systems integrators claim to offer solutions, but still "leave us stuck without a business application."

Advanced Tools: Modest Hopes

The survey found that most IS executives have only modest expectations for the advanced application-development techniques currently available. However, many pilot projects are underway, and most CIOs expect use of these techniques to increase. Respondents don't seem to be looking for panaceas, just a number of tools that can be applied as the situation requires.

The usefulness of some techniques depends on the size of the project and the character of the organization. Rapid application design can be very effective for small, cohesive projects. But for large projects, which are fundamental to an organization's business, CASE and IE provide a sound architectural foundation for growth and flexibility.

Dvorak, whose shop is relatively small, calls CASE "bandages and bailing wire for the inadequacies of Cobol, CICS, JCL, and the bulk of second- and third-generation application-development technology." He finds CASE too administrative and prefers prototyping and rapid application development. Roche also considers CASE "expensive, difficult to use and hard to integrate with other products." With a small staff, he "can't invest months and months in training, hoping for a long-range return."

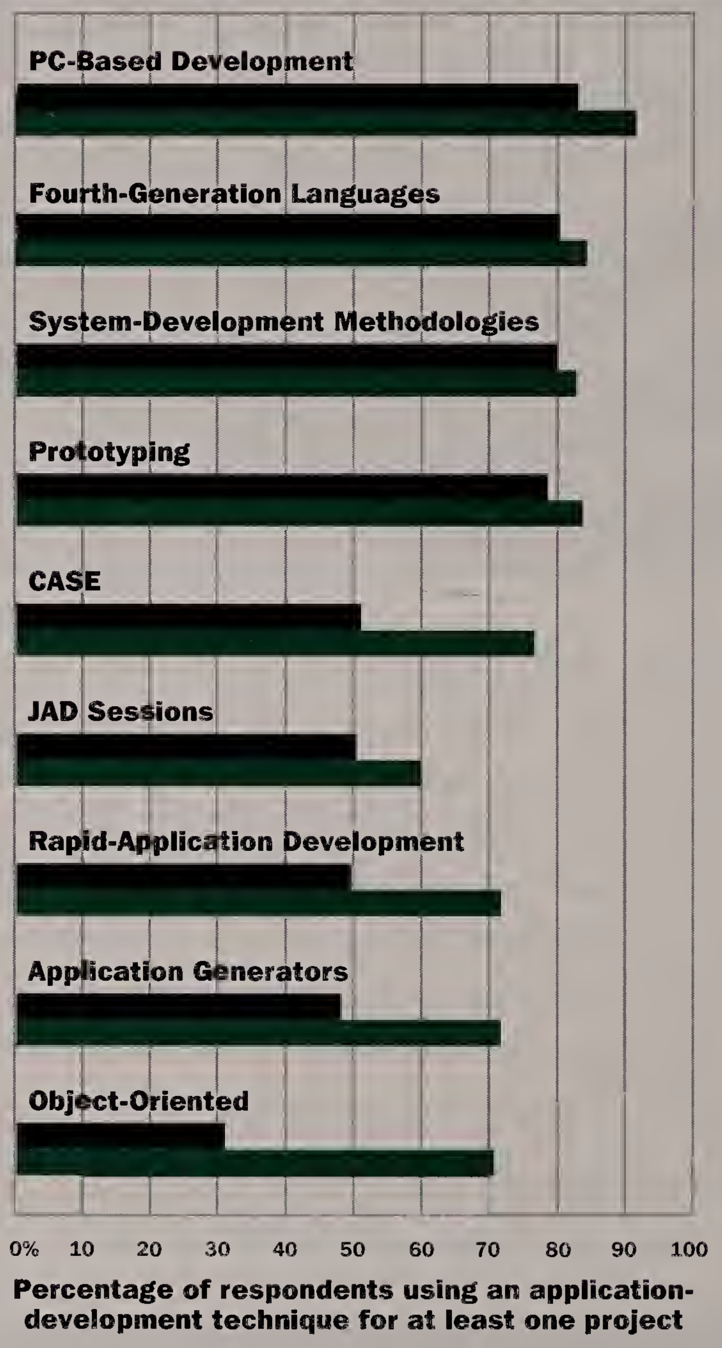
But for Schoebel, whose shop is larger, CASE is worth at least several pilot projects. While Schoebel hasn't implemented the technique full-scale, he thinks CASE holds some promise for large projects. "What it's done for us, at least in the upper CASE environment, I couldn't do with other means," he said.

Object-oriented programming apparently has a long way to go before it's widely seen as useful. It's appealing "cerebrally, but right now it's more theory than practice," said Dvorak. Roche also finds object attractive theoretically. "It's modular, reusable, basically platform-independent---the kind of thing I like," he said. "I'm not using it yet, but I have faith that it's going to be applicable in my environment eventually."

Budgets: More for the Money

In 1993 IS budgets are not expected to keep pace with inflation, the study showed. With the consumer price index running at about 3 percent, IS budgets are expected to grow on average only 1 percent. Does this mean that North American companies are cutting IS as a way to save in a weak economy? Or are CIOs being asked to do more with less? Roche thinks neither. "There's been a [new look at] the way IT money should be spent," he explained. "We

Application-Development Techniques



While PC-based development was the most broadly used application-development technique in 1992, object-oriented programming is expected to exhibit explosive growth. Object is appealing "cerebrally, but right now it's more theory than practice," said Daniel Dvorak.

CHART SOURCE: DELOITTE & TOUCHE

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read that IT expenditures in the 1980s brought a low return on investment. Perhaps money was being ill-spent. I think people may be spending their money more wisely today." IS executives do, in fact, seem to be getting more for their money. Kerr says his budget has remained essentially flat for six years, but the number of applications he's running has increased by a factor of three. "I'm getting 10 applications instead of three for half the dollars, if you adjust for inflation," he said. "I used to have 22 operators. Now I have three, and they don't really operate; they administer systems. We haven't reduced staff. We just never hired a lot more people to handle these extra systems."

Kerr attributes some of this increase in efficiency to downsized hardware. But Dvorak, who recently moved up to a mainframe, is also getting more bang for the buck. It's not downsizing or upsizing, says Dvorak, but rightsizing that leads to increased efficiency. "I don't think the platform is as important as the means by which you provide the solutions," he said.

Kerr and Dvorak agree that today's prototyping tools and fourth-generation languages have helped increase the number of systems they manage without increasing staff size and budgets. Kerr credits "basic development technology. Nothing really elaborate—just fairly basic stuff."

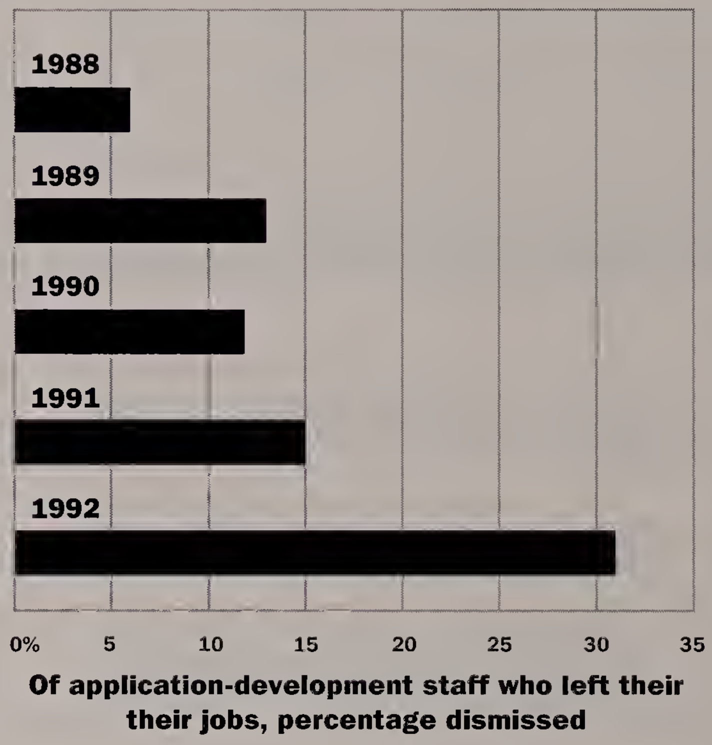
Outsourcing: Low Expectations

In every industry but banking, respondents expressed relatively low expectations for outsourcing. Some 58 percent have considered outsourcing some of their IS functions, but only 20 percent have actually done so. And those who have acted have found that even their modest expectations were not met.

The most commonly outsourced function is data entry—and even when data entry is outsourced, on average only about 33 percent of the function is turned over to outside vendors.

According the survey, about 54 percent of the typical IS staff is now dedicated to application development and maintenance. That's up from 43 percent last year, apparently reflecting a decreased need for staff in other areas. Turnover of applications staff seems to be leveling off at about 8 percent per year, but in 1992, 31 percent of those who left their jobs did so because they were dismissed. In 1991, only 15 percent were dismissed.

Staff Dismissal Rates



In 1992, the percentage of applications staff who left their jobs because they had been laid off or dismissed was twice as great as in 1991. The economy may have played a role, but performance is also an issue. People need to "start reading and learning about new platforms and technologies," said Michael Roche. "It's an initiative thing."

CHART SOURCE: DELOITTE & TOUCHE

Why are so many people being fired or laid off? The economy may have played a role, but performance is also an issue, according to Roche. People need to motivate themselves to "start reading and learning about new platforms and technologies," he said. "It's an initiative thing: IS managers can't always be tapping staff on the shoulder and saying, 'Go to this class.' " But Roche says he has had no problem finding or keeping talented people. "My experience is that people are looking for challenging assignments, fair compensation and a supportive culture to work in," he said. "If you provide that, they're not going to move. If they like what they have, it's difficult to draw them away with 10 percent more money."

According to the four panelists, IS executives looking toward the future are most concerned about avoiding inefficiencies that may occur as IS departments grow larger and discovering ways to measure productivity and the effect of IS on the business. Schoebel, who has led a large shop for many years, is particularly concerned about the former issue. Stressing the importance of the "break-it-up" rule, he "packages his staff into small business units and tries to make those units as autonomous as possible."

Kerr focused more on the second problem: "Sometimes I worry whether some of the things IS people spend their time on are really not just polishing brass on a sinking ship," he said. "Are we getting to the more fundamental business issues?

"It's not even aligning technology with business goals," Kerr continued. "The question is, are we making a difference? Can we look at the bottom line and say we spent $10-, $15-, $20 million on information systems and generated $40 million in savings for the company? Or are we just making life suddenly easier for 100 clerks?" CIO

Kathryn Hayley and Jeff Plewa are information technology consulting principals at Deloitte & Touche in Chicago.

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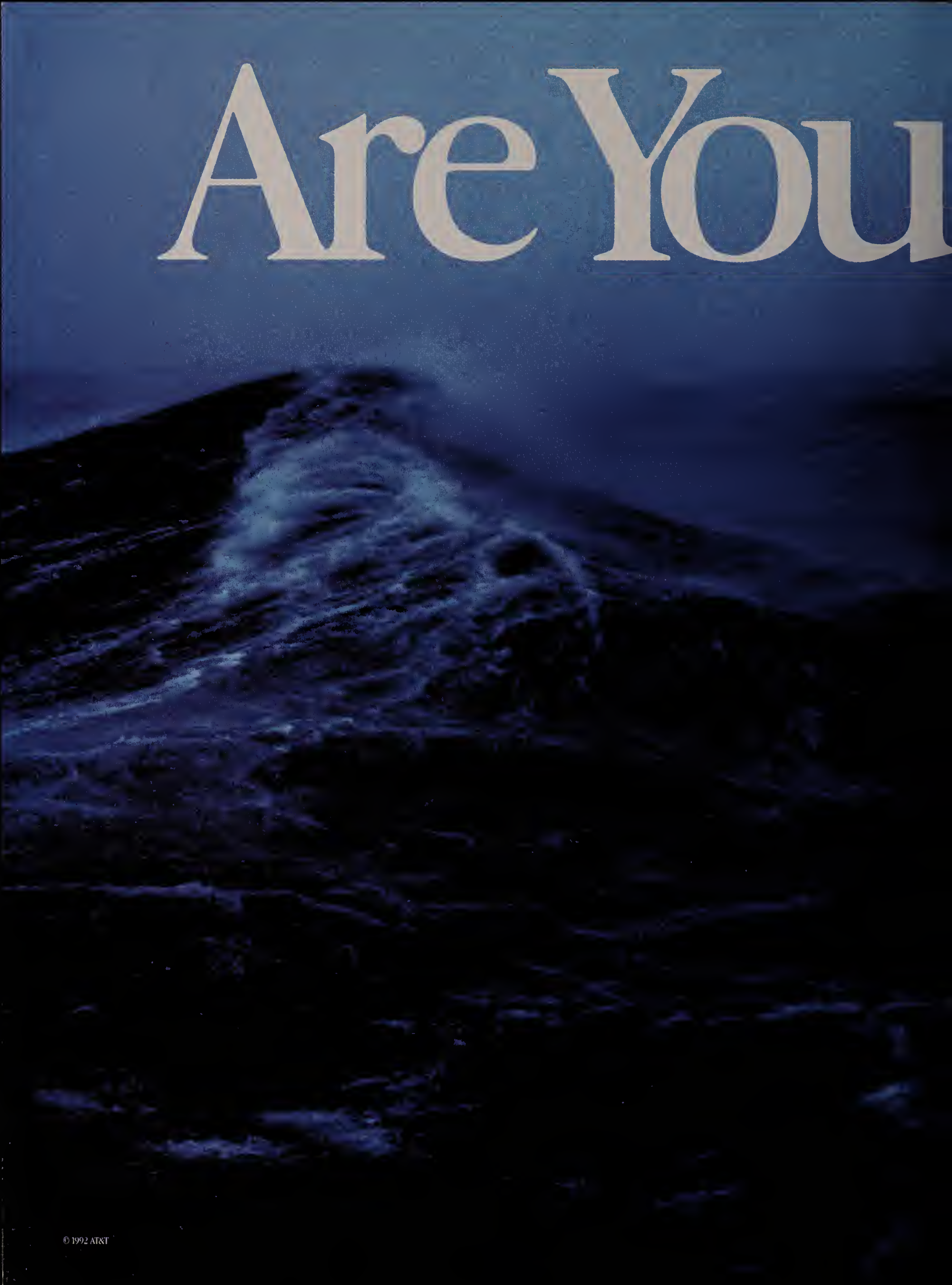

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I.S. QUALITY

THE HOUSE THAT QUALITY BUILT

Why is Total Quality Management such a big deal? Dissect the concept, and all you find are old chestnuts. Customer focus? Entrepreneurs have long known that opportunities abound for those who can deliver, at a reasonable price, the products and services customers want. Old hat, too, is the exercise of scrutinizing business processes with an eye toward improving them. Managing by fact is a new expression for an old drill. Performance metrics, client surveys, teams: All are as venerable as the grayest senior managers in the firm.

Quality is hot because promising new homes are being constructed out of these old bricks.

Improvement Starts At Home
IS executives have always professed to serve customers, but a quality perspective forces them to walk the talk.
PAGE 40

Getting To Know The Neighborhood
Benchmarking requires rigor, planning, focus and a great deal of time. If done incorrectly, this critical TQM ingredient can do more harm than good.
PAGE 48

Laying Out The Welcome Mat
IS has a lot of customers for the same systems, whose expectations and responsibilities may be vastly different. The trick is keeping them all happy.
PAGE 52

Leading Lights
At Carolina Power & Light Co., IS has been tapped to lead the company's TQM push. The department's efforts have set the stage for companywide reengineering and competitive repositioning.
PAGE 56

I.S. QUALITY

IMPROVEMENT STARTS AT HOME

Even without a corporate commitment to quality, IS executives can begin the quest for excellence by focusing on processes within their own departments

BY THOMAS KIELY

The Total Quality Management (TQM) vision is one of change, sometimes radical change, in the way companies are organized to operate—and in the way IS supports the business. IS executives have always professed to serve customers, but a quality perspective forces them to walk the talk.

It is still too early to judge whether the quality movement—and allied currents such as reengineering—constitutes a revolution, an evolution or just a passing fancy. Quality itself is no guarantee of performance: Both Federal Express and Xerox suffered profit slumps (for business reasons) after winning the Malcolm Baldrige National Quality Award. But proponents of quality in companies such as Eastman Kodak, Fluor Daniel and Aetna Life & Casualty argue that their quality programs are necessary for future competitiveness and, in some instances, already show bottom-line results.

In each of these companies, IS is part of the enterprisewide quality effort. But Warren Harkness, director of information services at audio-electronics company Bose Corp. in Framingham, Mass., says that quality can be a departmental pursuit as well. "Some people hide behind the excuse that there is not top-level enthusiasm for quality," he said. "But there is a lot one can

ILLUSTRATIONS BY BETHANY GULLY

do [on one's own initiative] to improve quality in IS."

"I agree with Warren to a point," said Roger Sobkowiak, a principal at Software People Concepts Inc., a New Haven, Conn., consultancy. IS executives can lay plans to better serve customers, streamline processes and abet the business, but there are limits to how effective a CIO can be without the collaboration of customers and senior managers. "You can make achievements, but not strides," Sobkowiak said.

"SOME PEOPLE hide behind the excuse that there is not top-level enthusiasm for quality. But there is a lot one can do on one's own initiative to improve quality in IS."
–Warren Harkness

For instance, at Eastman Kodak Co., in Rochester, N.Y., IS has been analyzing its internal processes, implementing a software-quality program, extensively utilizing teams, developing a new portfolio of quality metrics and benchmarking with IS organizations in other companies—all of which is possible without any link to a corporatewide quality program. But such endeavors would have been less thorough without the support of (and funding by) senior managers. What's more, the company as a whole has been adopting a quality program, so IS did not have to halt its efforts at functional borders.

Quality begins with an understanding of processes. A process, as a number of IS managers define it, is a group of related tasks with an input (a business objective) and an output (a business accomplishment). For example, new-product development is a process that takes an idea from the laboratory to the marketplace across such functions as research, marketing and manufacturing.

A process is also an organizing concept. Thomas Davenport, a partner with Ernst & Young's Center for Information Technology and Strategy in Boston, has point-

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Beyond Interior Design

Aetna's quality push aims to make it beautiful inside and out

Committing to quality requires time, patience and resources. The commitment is easier for companies to make if quality is a critical business driver. At Aetna Health Group, a unit of Aetna Life & Casualty in Hartford, Conn., quality management is a positioning strategy. Aetna wants customers to view it as the value choice in a field of insurance providers. So the company's quality push isn't simply focused inward, to tone up and trim down processes. It's also directed outward and exploited as something to market.

Both faces of quality were highlighted in the implementation of a mission-critical customer-management system launched in 1990. The new cross-functional system helps Aetna provide quicker and more accurate service to corporate health-plan customers. But in the process of building and implementing the system, Aetna adopted a number of quality practices, including process redesign, benchmarking and the designation of clear ownership and accountability of processes and functions. More than 60 cross-functional teams worked on the project; they included employees from marketing, finance, claims, underwriting and the legal department—and customers and outside medical professionals too.

IS will also play an important role in the company's medical quality efforts. Just as manufacturers steeped in quality will demand that their suppliers adopt such programs as well, Aetna is pushing quality on its network of doctors and hospitals. While the company now closely scrutinizes these suppliers, eventually it hopes to put systems in place that will collect and analyze the decisions that hospitals and doctors make—and the fees they charge—as a way to bargain for more value for the customer.

–T. Kiely

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ed out that since processes imply customers, attention to processes necessarily forces an organization to focus on its customers. Clear processes, with clear, quantifiable measures of progress, help mobilize employees to get the job done. (For more on benchmarking and metrics, see article on Page 48; for more on customers, see article on Page 52.)

BY CONCEPTUALLY SEPARATING I.S. AND I.T., CIOs SHOULD be able to focus more clearly on processes, which are outwardly directed, and keep the self-reflexive labors of managing the IS shop in perspective.

But what is an IS process? That question has preoccupied 15 companies participating in Ernst & Young's Total Quality Management for Information Services Leadership program. It's a seasoned group. All the IS organizations involved in the research program have more than two years of experience with quality, and among them are four Baldrige Award winners: Xerox Corp., AT&T, Texas Instruments Inc. and Milliken & Co.

Following a year of discussion concerning their diverse IS quality programs and objectives, the group devised what Ernst & Young calls a generic IT quality-process landscape (see box). While a process perspective for IS isn't new (IBM Senior Consultant Gerry Jacobs has been writing about "process models" for IS organizations since 1981), the leadership group distilled current thinking on the subject, and their own experiences, into a conceptual tool for senior IS managers. The landscape embodies the group's reasoning that technology operations can be ordered into seven separate IT or IS processes.

What's the difference between IT and IS? Companies with experience in IS quality emphasize the importance of distinguishing between the organization (IS) and the processes (IT). As Mary Silva Doctor, an Ernst & Young consultant working with the leadership group explains, IS encompasses the technology organization, while IT defines technology processes that reach beyond IS to cut across corporate functions and involve non-IS owners. By conceptually separating the two, IS executives should be able to focus more clearly on processes, which are outwardly directed, and keep the self-reflexive labors of managing the IS

IT Quality Processes

In Ernst & Young's quality-process landscape, the world of IS and IT activities is divided into seven processes that either create business value, provide ongoing business support or do both. Each encompasses a number of subprocesses and clearly defines its customers and products.

CREATING BUSINESS VALUE	ONGOING BUSINESS SUPPORT
❶ **IT enabled Business Opportunity Identification**	❹ **IT Operations**
❷ **IT Infrastructure Stewardship**	❺ **IT Customer Support**
❸ **IT Component Delivery & Evolution**	

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shop in perspective.

Once IS managers make that distinction—and begin to look at their operations through process-colored lenses—they will see more clearly the ways in which their shops may be misaligned to the business, and will uncover new solutions to vexing problems, said IBM's Jacobs. "If you think about it, we're still using an 18th Century craft methodology for what we're doing [on the verge of the 21st century]," Jacobs said. "We go out and ask customers for requirements, then turn those requirements over to craftsmen working in caves, who will design one-of-a-kind solutions." The waste, inefficiency and inflexibility of this system of production isn't fully exposed to managers' view except by recasting it around processes, Jacobs argues.

MANY I.S. MANAGERS CONTEMPLATING TQM ARE DAUNTed by the seeming enormity of the task. And TQM doesn't pay off for every aspect of IS. One information executive's advice: Pick your battles.

One CIO who has restructured his operations around processes is Richard M. Kesner, of Babson College in Wellesley, Mass. Various pieces of Kesner's present organization were fragmented (and reported to different college administrators), but he has gathered the pieces under one IS roof and grouped them into four processes. Information resources (including the library and the link to the national Internet network) delivers information; infrastructure management maintains the campuswide networks; end-user development provides services such as help desks, training and documentation; and process reengineering oversees strategic planning and internal consulting. As Kesner describes it, he reshaped IS so that "the network looks out, providing information to the desktop, and the users look into the network, to get the information they need to get the job done. The resources are what they're after, and we facilitate that."

Kesner's department buzzes with a variety of quality teams, and the verve for TQM has rolled out across the campus, pushed by Babson President William F. Glavin, the former vice chairman of Xerox. Babson will likely compete for the Baldrige Award sometime in the next few years, Kesner said.

An IT-process system is also the goal of a working group established by the Chicago-based Society for Information Management. As of this writing, the group had collected 36 potential processes and was trying to find ways to consolidate them. Another SIM quality working group, chaired by Bose's Harkness, developed an IS quality matrix. Based on the Baldrige Award criteria, the SIM matrix is a tool that allows IS executives to rate levels of quality in many areas under their purview (see "Trendlines," *CIO*, January 1993). For instance, one section of the matrix deals with product design. IS quality managers are asked questions such as "To what extent is there a design review and validation process?" If they answer that design review is informal, technical and lacks customer involvement, then the quality score for that element is low. Higher marks are earned by shops that have rigorous design reviews gauged by a number of metrics.

With TQM, the details count. At Fluor Daniel, an engineering and construction company based in Irvine, Calif., the details include a stringent supplier program—a staple of quality programs in manufacturing organizations.

Bill Mazilly, Fluor's vice president of information management (IM), said that key suppliers—including Digital Equipment Corp., Lotus Development Corp. and Novell Inc.—work on teams with IM staff and both internal and external customers to develop and provide solutions. IM is highly visible at the company: Mazilly is heading up a corporate project to figure out how the company can improve cycle time by 50 percent while reducing resources by the same amount. "This is our biggest TQM project" in the five years since the organization has embraced the concept, Mazilly said. "It will mean a quantum change for the company."

But the TQM effort doesn't pay off for every aspect of IS, Mazilly warns. Observers say that many IS managers contemplating TQM are daunted by the seeming enormity of the task. Mazilly's advice: Pick your battles. He decided to outsource his mainframes rather than draw them into the TQM program "because we wanted to be careful not to focus on things others could do better," he said. "We have focused on the business, looking for the ways that we can add value." CIO

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CIO and Booz·Allen & Hamilton have created the ESPRIT℠ Award to honor those organizations using IT to its fullest potential — companies that strive to use IT to provide real business value.

Positioning IT as a Business Asset

Many companies still regard information technology as an overhead expense, not as a valued asset. It’s time we turn these misconceptions around and inform organizations that IT actually can lower costs, increase profits or enhance your market image.

ever thought make that kind of the bottom line."

In essence, the ESPRIT℠ Award goes beyond recognition. It is an opportunity to provide hard, tangible facts about return on investment from information technology to the business community at large. It is an opportunity to demonstrate how partnering between business and technology executives can increase the effectiveness of both and accelerate the achievement of strategic objectives. By communicating the payback, *CIO* and Booz·Allen & Hamilton hope to encourage other businesses to invest in IT to ensure their survival in a fiercely competitive global market. The award recognizes those who have successfully provided value with IT, while providing *CIO* readers with the ammunition to both justify spending on information technology and measure IT's ROI.

Our Challenge to You

If your technology investment is paying off in this way, we want to hear about it....

We urge you to participate by filling out the ESPRIT℠ Awards application form. The January 1994 issue of *CIO* will feature the companies, government agencies and not-for-profit organizations that have proven that partnered IT investments can have a positive and sustained impact on the bottom line. Then in early 1994, *CIO* and Booz·Allen & Hamilton will host a special awards ceremony honoring these winning organizations.

For more information, contact Mina Ahn at (508) 935-4449.

The 1993 ESPRIT℠ Awards

For Excellence in Strategic Partnering for Return from Information Technology

Sponsored by *CIO* Magazine and Booz·Allen & Hamilton

STATEMENT OF PURPOSE

Executives are aware of the potential benefits of information technology (IT) but remain unsure of its actual value to their organizations. In order to demonstrate how IT can produce hard-dollar benefits when aligned with business needs, *CIO* Magazine and Booz·Allen & Hamilton are co-sponsoring the ESPRIT℠ Awards. The honorees will be public and private companies, government agencies and not-for-profit organizations which have proven that IT investments can have a positive and sustained impact on the bottom line. Winners will be honored at an awards ceremony and profiled in the January 1994 issue of *CIO* Magazine.

DEADLINE
May 15, 1993

MAIL TO
ESPRIT℠ Awards
CIO Magazine
492 Old Connecticut Path
PO Box 9208
Framingham, MA
01701-9208

CIO will also use the information collected from entrants to provide readers with insights into how to calculate the return on investment from information technology.

We invite information-systems (IS) and business-unit executives to jointly apply for the award, provided that:

▸ they can demonstrate, in actual dollars, the return on investment achieved from the application of IT, and

▸ they are willing to be featured, along with their system and organization, in a *CIO* article.

CRITERIA

Winners will be chosen by a panel of independent judges from entrants who have sent in completed nomination forms by May 15, 1993. Entries will be judged on the following criteria:

- The measurable financial return to the organization.
- The extent to which that return is aligned with the organization's strategic objectives.
- The extent to which IT was key to the achievement of the return—the "couldn't have done it without technology" factor.

The sponsors and judges will determine the number of awards and the award categories.

Telephone interviews, and in some cases face-to-face interviews, will be requested by the Booz·Allen screening teams. These teams may elect to visit the finalists' sites in order to review in greater depth the entry, the system and the environment in which it is functioning.

ENTRY GUIDELINES

- The system must have been operational prior to July 1, 1991.
- Entries must be made jointly by the IS executive AND at least one of the business-unit executives for whom the system delivers value.
- Entries must be complete. Incomplete entries may be returned for elaboration or disqualified.
- Entries must be on 8.5x11-inch paper, one side per sheet.
- The entry form may be reproduced.
- Multiple entries from one company will be considered,

but each entry must be submitted separately.

- Vendors, public-relations and advertising firms, consultants and other third parties may NOT apply on behalf of another firm. They may forward this form to the "owner" of the system, or contact *CIO* Magazine to recommend that an entry form be sent.
- All entries must be computer-generated or typed; no handwritten entries will be accepted.
- Where feasible, an additional copy of the entry should be sent on a floppy disk. Electronic entries must be limited to word-processing and spreadsheet packages that are compatible with *Microsoft Word* and *Microsoft Excel* on either a PC or Macintosh platform.

1. COMPANY/BUSINESS UNIT

NAME OF PARENT COMPANY:

CITY, STATE WHERE HEADQUARTERED:

IF A COMPANY, IS IT ☐ PUBLICLY HELD? ☐ PRIVATELY HELD?

ANNUAL REVENUES:

INDUSTRY:

NAME OF BUSINESS UNIT OR ORGANIZATION:

CITY, STATE WHERE LOCATED:

NUMBER OF EMPLOYEES:

2. ENTRANTS

NAME OF ENTERING BUSINESS-UNIT EXECUTIVE:

TITLE:

NAME OF DIVISION, DEPARTMENT OR UNIT:

ADDRESS:

CITY:

STATE: ZIP:

TELEPHONE: ( ) FAX: ( )

NAME OF ENTERING IS EXECUTIVE:

TITLE:

NAME OF IS ORGANIZATION:

ADDRESS:

CITY:

STATE: ZIP:

TELEPHONE: ( ) FAX: ( )

3. SUPPORTERS

Please list four people who are willing to be interviewed with regard to the system, its development, its use and the value returned. At least one should be a member of the technology team that developed the system and should have played a significant role. At least one should be a primary user from the sponsoring business unit. The other two may be from either organization or represent suppliers, customers or others intimately familiar with the system.

A. NAME:

TITLE:

TELEPHONE: ( )

REASON FOR INCLUSION:

B. NAME:

TITLE:

TELEPHONE: ( )

REASON FOR INCLUSION:

C. NAME:

TITLE:

TELEPHONE: ( )

REASON FOR INCLUSION:

D. NAME:

TITLE:

TELEPHONE: ( )

REASON FOR INCLUSION:

4. THE NOMINATED ORGANIZATION

Please tell us about your organization (company, business unit, agency) in 500 words or less. Include information on:

- when the organization was founded;
- mission statement;

- major products and services;
- markets served, and
- any other data you believe relevant in terms of general background.

5. THE NOMINATED SYSTEM

Tell us about the nominated system and demonstrate its ROI by completing the following sections. Please limit your material to five pages.

- **Objectives:** Identify the primary business objectives of the IT investment.
- **Scope and Impact:** Identify the functions (e.g., customer service, manufacturing, planning) that were changed by the system, the nature of those changes and their impact on the business. Identify other business-change initiatives tied to the IT investment.
- **Alignment with Strategic Objectives:** Describe how the technology investment is aligned with the organization's strategic objectives, including any new business initiatives. Note any significant event that would help us evaluate the nominated system's value. Examples might include a merger, a new distribution channel or a significant regulatory change.
- **The Importance of IT:** Identify the different components of the overall business change (e.g., business reengineering, downsizing, cycle times). Explain the importance of the IT component to the overall business change.

6. TECHNICAL PROFILE

Briefly describe the technology of the nominated system. Please include the names of major vendors and products. If you prefer, you may attach a document containing a technical description of the system, providing it is no more than five pages.

NOTE: The examples provided here are meant to be illustrative, not all-inclusive.

- **Architecture** (e.g., mainframe, distributed, client/server)
- **Hardware** (e.g., mainframe/parallel processor, minicomputer/server, desktop computers, handheld/portable devices)
- **Software** (e.g., operating systems, database system, shells, application software)
- **Software development tools** (e.g., CASE, 4GLs, GUI developers, object-oriented development tools)
- **Networking/Communications hardware, software and services** (e.g., modems, routers, electronic-mail packages, carriers and public networks)

7. TRUTH OF INFORMATION/RELEASE

The following release must be signed by both nominating executives if the nomination is to be considered. Unsigned releases will invalidate the entry.

I hereby state that the information provided is true and complete to the best of my knowledge and belief.

I authorize the release and use of, in connection with the ESPRIT℠ Awards program, any and all materials furnished by me or others at the company contacted for this judging. I understand that information submitted on this entry form or subsequently gathered during the evaluation and judging process may be used in articles or any other type of publicity relating to the ESPRIT℠ Awards program.

I also authorize the release and use of my name, my company's name and my likeness, including but not limited to any photographs and any recording of my voice or image that may be taken of me for *CIO* Magazine. I agree that no compensation shall be due me or my company for such usage.

I recognize that failure to meet these conditions or to provide sufficient material that can be published can cause the nomination to be rejected at any point in the process at the sole discretion of the sponsors.

SIGNATURE OF NOMINATING BUSINESS EXECUTIVE: ____________________

DATE: ____________________

SIGNATURE OF NOMINATING IS EXECUTIVE: ____________________

DATE: ____________________

8. OTHER EDITORIAL OPPORTUNITIES

If you are not selected as an award recipient, are you willing to be contacted for inclusion in other articles in *CIO* Magazine? Yes ☐ No ☐

How did you learn about the ESPRIT℠ Awards program?

- ☐ *CIO* Magazine
- ☐ Booz·Allen & Hamilton
- ☐ IS staff member
- ☐ Other publications
- ☐ Other (please identify) ____________________
- ☐ Vendor
- ☐ Academician
- ☐ Consultant
- ☐ Systems integrator

CHECKLIST

Have you filled out...?

- ☐ Company/Business-Unit, Entrants and Supporters Information
- ☐ Return on Investment Chart

Have both entrants signed and dated...?

- ☐ Truth of Information/Release

Have you included on separate pages...?

- ☐ Nominated Organization
- ☐ Nominated System
- ☐ Technical Profile
- ☐ Additional Return on Investment Material

Have you checked off...?

- ☐ Other Editorial Opportunities
- ☐ How you learned about the ESPRIT℠ Awards program?

9. QUANTIFYING RETURN ON INVESTMENT

Directions

- The table below provides a framework for breaking down costs and benefits. Feel free to break down any line item into additional components, or to add new line items if necessary. Please explain how the figures were arrived at, on separate sheets if necessary.
- In quantifying costs and benefits, every effort should be made to quantify strategic and "intangible" benefits (e.g., competitive positioning, risk management). It would be helpful to attach any documents you have prepared that explain the system's costs and benefits.
- You may also include your own return on investment calculations and frameworks to further explain your return on investment. These can be attached to your nomination form.

Guidelines for Quantifying Return on Investment

- Provide return and investment figures five years out from initial implementation. Where the system has been in operation for less than five years, you may project future investments and returns *based on historical data.*
- All investments and expenditures made before implementation should be included in year "zero."
- Distinguish actual costs and benefits from projected costs and benefits.
- To the extent the nominated system replaced older technology, the system investment reflected in the tables should be net of corresponding salvage values and ongoing costs.
- Return and investment figures should be stated on an approximated after-tax basis.

NOTE: The examples provided below are meant to be illustrative, not all-inclusive. All numbers are subject to verification.

Return:	**Year 1** 19 ___	**Year 2** 19 ___	**Year 3** 19 ___	**Year 4** 19 ___	**Year 5** 19 ___	**TOTAL**
Incremental profits from enhanced revenue (e.g., new revenue streams, productivity improvements)						
Reduced operating costs (e.g., labor, material)						
Reduced capital investments (e.g., capital equipment)						
Reduced inventory						
Indirect cost avoidance (e.g., avoided hiring, fines, fees)						
Total Annual Return	**$**	**$**	**$**	**$**	**$**	**$**

Total Return: $

Investment:	**Year "0"** 19___-19___	**Year 1** 19 ___	**Year 2** 19 ___	**Year 3** 19 ___	**Year 4** 19 ___	**Year 5** 19 ___	**TOTAL**
Technology purchases (e.g., hardware, software, lease payments, amortization)							
System development and implementation (e.g., systems integration and consulting fees, initial training)							
Ongoing system maintenance and enhancement (e.g., updating system, maintaining and replacing software, adding users)							
Ongoing system operations (e.g., ongoing training and consulting, help desks, other ongoing support)							
Non-systems operational charges (e.g., increased labor or inventory, early retirement program for laid-off employees)							
Total Annual Investment	**$**	**$**	**$**	**$**	**$**	**$**	**$**

Total Investment: $

Total Return on Investment: $
(Total Return minus Total Investment)

The 1993 ESPRIT℠ Awards

Honoring Excellence in Strategic Partnering for Return from Information Technology

Sponsored by *CIO* Magazine and
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CIO
THE MAGAZINE FOR INFORMATION EXECUTIVES

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For more information, see the ESPRIT℠ Awards entry form bound within this issue of *CIO*. If the entry form has been removed, call Mina Ahn at (508) 935-4449.

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THE MAGAZINE FOR INFORMATION EXECUTIVES

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GETTING TO KNOW THE NEIGHBORHOOD

Benchmarking gives IS departments the license to tour stately homes—and come away with a few ideas in the process

BY THOMAS KIELY

Benchmarking is a critical ingredient of a good TQM program—but it isn't for wimps. To be done correctly, it requires rigor, planning, focus and a great deal of time, according to IS executives experienced in the art. Companies should have a good understanding of their own internal processes and a workable grid of metrics in place before beginning to benchmark. If done incorrectly, consultants warn, benchmarking can do more harm than good.

Benchmarking is the act of contrasting one's internal processes (project planning, IT marketing or the delivery of new IT applications) against more robust or effective examples of these processes at other organizations. It is essentially an act of humility, forcing the overweight, gimpy, stoop-shouldered and homely to stack themselves up against the fit and handsome.

Mortifying as some benchmarking exercises can be, they provide valuable information to companies seeking to improve performance (see "Those Who Can, Teach," *CIO*, Sept. 1, 1992). What's more, they can speed up implementation of quality programs, according to Carla O'Dell, director of the International Benchmarking Clearinghouse, a division of the Houston-based American Productivity and Quality Center. Adopting TQM can be slow going, and benchmarking offers "a structured way for organizations to learn and [thereby] accelerate their progress with quality programs," she said.

O'Dell recommends that companies interested in benchmarking first identify a specific process they hope to improve—one that is narrowly focused and manageable. Benchmarking software development can be a project that consumes careers; a subprocess, such as development of applications for distributed systems, is a better bet. The next step is to put together a benchmarking team that includes employees "who own and understand the process," she said.

It is the team's responsibility to devise and dispatch surveys to potential benchmarking partners, assess the information received and arrange a site visit for detailed discussions. Initially, though, the team

should carefully map out a benchmarking strategy and continually reassess its venture, advises Maryann Holloway, benchmarking manager in strategic IS planning at E.I. du Pont de Nemours & Co. The chemical giant, based in Wilmington, Del., has benchmarked processes for years. "You have to prepare rigorously," Holloway said. Unfocused surveys yield ambiguous information, and during on-site visits, "it's easy to get distracted. There are so many things you want to know; you could spend days talking [to employees of the company]. Focus on the process."

Holloway's observations are echoed by Tom Dwyer, vice president of information services at Carolina Power & Light Co., a utility based in Raleigh, N.C. The company's IS organization benchmarks continually. Dwyer, who tries to complete four or five benchmarking programs a year, sometimes runs exercises jointly with the internal CP&L customers affected by the systems under review. "The trick to benchmarking is to understand where you are and have a good vision of where you want to be," he said. "Develop your questions around these two issues and focus entirely on processes. You want to know the details of processes."

But all this presupposes that IS departments have a good understanding of their own processes—something many organizations are still trying to attain (see article on Page 40). And in order to adequately compare process to process, benchmarkers need rigorous and consistent measures of IT effectiveness. Two years ago, the IS group at Eastman Kodak Co. in Rochester, N.Y., stepped up to the benchmarking plate by hosting a

"COMPANIES measure things differently, and we don't have a good strategy yet for dealing with that. We want to be able to compare apples to apples."
-Warren Harkness

session with the IS organizations of six other companies. The participants quickly realized that each organization measured some aspects of IT differently. One counted the cost of end-user hardware among overall hardware costs, the rest did not; and some, but not all, included contract labor in their labor costs.

Such inconsistencies can be daunting to prospective benchmarkers. "We've been prowling around the idea of benchmarking," said Warren Harkness, director of information services at audio-electronics company Bose Corp., in Framingham, Mass. "But companies measure things differently, and we don't have a good strategy yet for dealing with that. We want to be able to compare apples to apples, not apples to oranges."

But longtime benchmarkers like Du Pont warn that fretting over the inconsistencies of metrics can distract practitioners from the real goal of benchmarking—which is the study of processes, sometimes in minute detail, in the hope of discovering fresh ideas to take home. (In fact, Du Pont has pruned its metrics portfolio, dropping measures it believed yielded little useful information. Holloway declined to cite examples of these, however.) What's more, good benchmarkers look outside their industries, even outside their functions, in the search for ideas—and in these instances, measurements will always be inconclusive.

But how do companies uncover best-of-breed processes they hope to benchmark against? Du Pont networks with other benchmarkers and collects articles on best practices, among other strategies. The Benchmarking Clearinghouse can help: It has a database of 40,000 key benchmarking contacts throughout the world. Ernst & Young's Total Quality Management for Information Services Leadership program is collecting examples of top-notch practices within the world of IS. As of this writing, the firm had assembled a catalog of 63 such "leading practices." Some of these were suggested to Ernst & Young by a Society for Information Management working group on TQM in IS, which is trying to compile a similar list.

Du Pont, CP&L, and Kodak stress that prospective benchmarkers should look for the best examples of those processes. Companies shouldn't benchmark with just anybody; rather, they should stick to organizations that have developed first-rate versions of the processes in question. Du Pont, like most giants, usually benchmarks against companies its own size. But Rick Swanborg, a consultant with Ernst & Young's Center for Information Technology and Strategy in Boston, thinks this is a mistake. "Little companies have some of the most advanced IT practices," he said. As examples, he cites First Chicago Bank, Citizen's Gas & Coke Utility, Society Corp. and Carolina Power & Light—all members of Ernst & Young's TQM-IS leadership program.

Swanborg also warns that benchmarking isn't an activity for the innocent. He knows of instances where high-quality organizations have allowed their processes to be scrutinized as a way of gaining competitive intelligence about the benchmarker. "They know they have the kind of organizations in place that can change quickly if they need to," Swanborg said. Information is swapped in the benchmarking exercise—but the higher-quality organization can exploit what it has learned far faster than the other party at the table.

There are other reasons why prospective benchmarkers should be cautious. A report on quality practices issued last October by Ernst & Young and the American Quality Foundation, a nonprofit think tank based in New York, challenged the notion that quality programs were universally beneficial for all organizations. Based on a study of 584 companies in North America, Japan and Germany, the report observed that Total Quality Management practices are not generic—what works well for some organizations may prove detrimental to the performance of others.

Benchmarking is a case in point. Companies that have a solid quality program in place and a culture adaptable to change can translate the information gleaned from benchmarking into practice. But in lower-performing companies, benchmarkers studying their betters often set unreasonable goals back home, thereby impairing performance rather than enhancing it.

The Benchmarking Clearinghouse's O'Dell does not agree. "High-performing companies will do well at benchmarking because they are systematic, committed and thorough at everything they do," she said. "But it's not true that companies just starting out in benchmarking will botch things. Any company, if it has the will to improve, will learn much from benchmarking."

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I.S. QUALITY

LAYING OUT THE WELCOME MAT

The IS dream house is a place where individual customer demands are recognized and met without sacrificing the overall goals of the organization

BY MEGHAN O'LEARY

The essence of total quality in IS is simple: meeting the needs and expectations of the customer. As service providers, however, IS departments typically have a lot of customers for the same systems, customers whose expectations and responsibilities may be vastly different. For reasons of economics, time or politics, customers are bound to come into conflict, and in meeting the needs of one, IS runs the risk of alienating another.

For this reason, IS departments must learn to identify their customers' needs and expectations and then place the responsibility for setting priorities and making trade-offs into the customers' hands. By avoiding the role of the middleman while remaining an active team player, IS can help ensure that its customers are happy and that the services it delivers support the business objectives of the organization.

The first difficulty is that many IS groups don't clearly understand who their customers are, according to William E. Perry, executive director of the Quality Assurance Institute in Orlando, Fla. Simply, the customer is anyone to whom a product is delivered. This may be a group of customers that includes a user department, a corporate sponsor and the person footing the bill. IS ignores any of these at its peril.

Complicating the task of satisfying customers is that "depending on the product or service you're talking about, [users] are going to have different expectations" from one another, said John J. Burbridge Jr., director of the David D. Lattanze Center for Executive Studies in Information Systems at Loyola College in Baltimore. The Lattanze Center teaches IS executives to behave as professional service-providers. This means focusing on improving those products and services that require the highest level of customer interaction—and thus create the greatest customer expectations.

In the business world, however, such improvement is necessarily guided, at least in part, by budget considerations. Conflict is inevitable between customers who de-

fine quality purely in terms of functionality and those whose views are shaped by the expectation of low costs. Total-Quality proponents recognize that customers who pay the bills generally have more clout than those who will actually use the system. CFOs and their ilk have more decision-making power than the end users, so their priorities may override the pursuit of Total Quality. No matter how committed an organization is to Total Quality, sometimes it will have to choose between satisfying everybody and satisfying the financial concerns of the most powerful person involved in the project.

"We're in real business," said William R. Roth, manager of organization and information systems at the Westinghouse Productivity and Quality Center in Pittsburgh. "We have to do the things that are beneficial from an overall business standpoint." A project's financial sponsors are responsible for overseeing that, he said.

"It comes down to how much quality can I afford," said Larry A. Whobrey, quality improvement coordinator for the corporate service division of Caterpillar Inc. in Peoria, Ill. Rather than let IS try to answer this question and alienate end users in the process, Whobrey brings the project's financial sponsor and its primary users together with an IS representative to work out a solution that everybody can live with. At United Services Automobile Association (USAA) in San Antonio, Texas, Fred Martin, director of IS services quality assurance, relies on management advisory councils to make joint decisions about cost. These councils, composed of a senior executive sponsor and a group of line managers, take the pressure off the IS department.

Knowing who the customers are is one

I.S. QUALITY

ONLY BY ESTABLISHING effective lines of communication will IS professionals be able to distinguish between customer perceptions and IS perceptions of a product or service.

challenge; understanding their requirements is another. In order to determine what customers need, IS must hold more than just a superficial dialogue with them, according to Whobrey. Only by establishing effective lines of communication will IS professionals be able to distinguish between customer perceptions and IS perceptions of a product or service. What's "fast response time"? What's "easy to use"? How much documentation is enough? Too much? Customers' answers to these questions are likely to be different from those of the IS department, so it's important to pin down specifics.

While such mechanisms as focus groups, project teams and surveys to determine customers' needs are fundamental to most total-quality efforts, some problems require a more focused approach. Richard M. Kesner, CIO at Babson College in Wellesley, Mass., found surveys to be vague about specific problems and ineffective in helping him identify areas for improvement, so his department created a help desk. By keeping statistics on every call, help-desk representatives are able to identify a word-processing package that is difficult to use or a database whose fields are too inflexible for users. They also leave cards on customer PCs after every service, asking for feedback. By dealing with customers' specific problems, Kesner can offer them specific solutions.

Kesner believes that customers, for their part, are responsible for making their needs known. Madge Lewis, registrar for graduate programs at Babson and—by his own estimation—Kesner's toughest customer, admits that her department is only fair at asking for what it needs. Part of the reason is that the department is still discovering what is possible with information technology. Also, it's still learning how to communicate with frontline analysts—where to draw the line and when to go over their heads. "It's partly a learning process, part-

The Bricks and Mortar of Customer Relationships

- **IDENTIFY** all the recipients of a product or service, from the end users to the department paying for it.
- **KEEP IS** service levels commensurate with the level of user involvement in a project; user expectations tend to be highest where user involvement is greatest.
- **USE** focus groups, project teams and surveys to understand what customers want, and learn about their needs from the problems they bring you.
- **MAKE** sure you're speaking the same language as your customers: Attach specifics to such entities as "fast" response time and "ease of use."

- **DEVELOP** procedural mechanisms, such as service-level and response-time agreements, to meet customer needs.
- **INCLUDE** customers on project-design teams and allow them to review the system in development at regular intervals to let you know how you're doing.
- **ENCOURAGE** customers to develop a good rapport with systems analysts and make sure they learn how to ask for what they need.
- **LET** customers whose needs conflict work together to find the best business solution to a problem, using the organization's strategic plan as a guide.

–M. O'Leary

ly a cultural shift," she said.

Once the IS department has determined what its customers really want, according to the Lattanze Center's Burbridge, its challenge is to translate those needs into managerial tools for delivering quality, such as service-level and response-time agreements. Such tools, designed to reduce the number of mistakes and delays, can also help to reduce the cost of delivering quality.

USAA's Martin translates customer needs into specifics by making sure that his customers review every phase of a project. Customers offer their input and voice their concerns about each phase, allowing the IS department to make the necessary adjustments to keep projects in line with their needs. Every project is reviewed by its own management advisory council—the same council that makes the cost decisions. Users and IS work together to define requirements and develop the applications. In some cases, a representative from the customer department will be assigned to work full-time with the IS department.

Babson's Kesner includes customers on design teams as well, because such involvement exposes them to the limitations of information technology and budgets, and educates them about the political realities and organizational requirements of working with other departments. In addition, he writes contracts with them detailing each party's responsibility for delivering a system, from attending meetings and testing prototypes to meeting deadlines.

While IS concentrates on finding ways to satisfy individual needs, it must never lose sight of the overall strategic picture. For this reason, it must learn to recognize what Burbridge calls "customers with a 'big C'," the people who are responsible for meeting the overall objectives of the company. "The specific user won't be in that job for life, so you have to keep in mind the priorities of the organization, even if the 'small c' customer doesn't understand that. That's one area where the CIO should be providing significant amounts of direction," Burbridge said.

"Total Quality doesn't replace strategic planning or priority-setting," said Kesner. "Your institution has to set clearly defined priorities, strategies and objectives, and allocate resources as a means of obtaining those goals. Total Quality might be the series of steps you take within an individual goal to achieve it. The two are complementary; you could do quality and still go bankrupt because you're not positioning yourself strategically."

USAA's IS department keeps in touch with its "big C" customers by being a part of the organization's yearly budgeting and planning meetings. That way, customers can help decide what role technology will play in meeting business objectives and set the business priorities that will guide them through every decision-making process. At Corning Inc., in Corning, N.Y., departmental vice presidents work with IS peers located in their own departments. The IS rep takes direction from the user department but is on the IS payroll and keeps IS attuned to the department's needs.

TOTAL-QUALITY ADVOCATES ADMIT THAT IS HAS TRADItionally lagged behind other functions in implementing quality and learning how to be customer-oriented.

Total-Quality advocates admit that IS has traditionally lagged behind other functions in implementing quality and learning how to be customer-oriented. But Caterpillar's Whobrey believes IS is already under such pressure to meet customer needs in a timely fashion that it is hard-pressed to find the time to figure out how to improve its service in other ways. Customers must learn to be proactive and ask for what they need, he said. "In groups that are actively involved in quality, I see a more educated group of people who ask better questions and are more willing to spend the time because they want to do the right thing.

"Our customers want quality because they think they deserve it, but they don't necessarily know what it means," Whobrey continued. "I think they're obliged to find out what it means for them in terms of cultural change."

Babson's Kesner agrees that educated customers will speed the learning process. As one of his customers, Registrar Lewis believes Kesner's organization has a lot to learn about the business processes that support her department's goals, but she is clear about her own responsibilities as a customer rather than just a user. "Everything we do is about customer service and always has been," said Lewis. "[Now my department and IS] have tools and are talking the same language. Now we have a way to focus our energy together."

I.S. QUALITY
PROFILE

LEADING LIGHTS

When Carolina Power & Light sensed a dimming of its competitive edge, it decided to begin the recharging process in IS

BY MEGHAN O'LEARY

IS managers may be at the leading edge of technology, but they often lack true leadership abilities, especially when it comes to implementing new management practices. But at Carolina Power & Light Co., in Raleigh, N.C., IS has been tapped to lead the company's TQM push. The department's efforts have set the stage for reengineering and competitive repositioning throughout the company.

Back in 1984, CP&L's senior management had determined that the only way the company could survive and flourish in the face of growing competition was to offer better service and improve cost-effectiveness and efficiency internally. It took a hard look at its aging service and administrative systems, and it didn't like what it saw.

By 1986, senior management had decided to explore reengineering these systems using the principles of TQM. The managers involved understood that technology was the crux of reengineering, and "we knew we had to have an IS organization that had been optimally designed," said Charles D. Barham, executive vice president and CFO.

For this reason, the board decided to draft IS as a pilot redesign site. It also hired two former consultants—Tom Dwyer, as vice president of information services, and Cindy Smith, as manager of computer services—to lead the project and bring a stronger business perspective to IS.

Smith and Dwyer began looking for opportunities to improve IS based on two corporate initiatives: creating a customer-focused organization and initiating a corporate information resource planning project. Their first step was to map out the department's processes and key customer services.

While interviewing IS customers and staff, Smith and Dwyer ran into a major obstacle: The IS culture was not sufficiently open to encourage employee honesty about what needed improvement. They recommended that managers throughout the company begin developing trust and communication with employees. IS initiated regular staff meetings to discuss the department's direction, progress and changes. Workgroups within IS held similar meetings. And confidential surveys and meetings where executives interviewed staff without mid-level managers enhanced communication.

Next, Smith and Dwyer used a model developed by IBM to break down IS activities into processes (such as technology innovation) and subprocesses (such as identifying specific technologies to introduce into the company) and to determine who was

TOM DWYER (FRONT) AND CINDY SMITH LED A COMPLETE OVERHAUL OF CP&L'S CUSTOMER-SERVICE SYSTEM, WORKING CLOSELY WITH PROJECT SPONSOR NORRIS EDGE (FAR LEFT) AND VICE PRESIDENT OF CUSTOMER SERVICE JIM MASSENGILL.

PHOTO BY KATHERINE LAMBERT

SNAPSHOT

Recognizing that it needed to improve service and efficiency, Carolina Power & Light decided to reengineer its aging service and administrative systems. Using IS as a pilot redesign site and adhering to the principles of TQM, the company wound up with a completely reengineered customer-service system and a more open corporate culture.

responsible for each. Doing this allowed the pair to identify activities that could be eliminated or modified. The same approach was taken with research and development, product evaluation and network management. And Smith and Dwyer established standards so employees could concentrate on delivering creative solutions rather than figuring out processes.

The pair also formed management councils to enhance IS marketing and education companywide. The first, a cross-functional senior-management group, evaluated and ranked IS projects based on the company's strategic objectives. A vice presidents' group, comprising divisional heads and Dwyer himself, made all major technology decisions. Although IS plays a role in both councils, "we make sure that they own everything we do," said Dwyer. "They are in charge."

After 18 months of interviewing users and dissecting and revamping IS processes, Smith and Dwyer decided to scrap CP&L's 20-year-old accounting-based customer-service system and develop one that would give service reps the requisite information to help any customer in one call. In order to reengineer the system, a complete reworking of the systems-development process was also necessary. Smith and Dwyer hired a new head of systems development and some additional staff with experience in building and delivering large customer-service systems. They then adopted a methodology from Andersen Consulting that included process-redesign and change-man-

I.S. QUALITY

SMITH AND Dwyer formed management councils to enhance IS marketing and education companywide.

agement components.

Finally, they proposed a strong senior-management sponsor for all major initiatives. In this case, the bill was filled by Norris L. Edge, senior vice president of customer & operating services. IS acted as a facilitator, meeting with Edge monthly at first, and more frequently during key portions of the project. Edge's department provided a co-manager to work closely with the IS project manager. The IS manager would handle technical issues while the client manager would deal with internal politics and change management.

While IS was reexamining processes and reapportioning responsibility, Smith and Dwyer were learning about their employees. By establishing standards for performance, they were able to identify poor performers and work with human-resources representatives to train or, in some cases, get rid of them. They also realized that they had not been adequately recognizing and rewarding good performers. To correct this, they worked with human resources to develop performance measures for IS staff that addressed teamwork, client relations, and communication and technical skills. Staff members now set skill-level goals and discuss expectations with their managers; performance evaluations may include interviews with an employee's customers and peers. Semiannual reviews outline a training plan based on each staff member's evaluation, developmental needs and work assignments.

In January, the company rolled out its completely reengineered customer-service system—250 brand-new, redesigned processes delivered on time and within budget. Effective change management allowed the company to accomplish the changeover all at once without running parallel systems. CP&L spent the better part of a year bringing functional people onto the project team, training users and letting everyone know what to expect when the changeover occurred. The biggest user groups had IS coaches to help them through rough spots.

Although the company is waiting until the dust settles to perform concrete measures of return, CFO Barham already sees a dramatic improvement in customer-service reps' response time. He expects to eventually eliminate more than 100 of the 450 service-rep positions, since operators can now help customers with almost any kind of problem without drawing managers into the process. (Of those 100 positions, half are now filled by temporary workers, according to Dwyer, and the company is relying on attrition over the next 18 months to vacate the other half.)

CP&L is now reworking its financial-accounting system and moving to a TQM-based system of total-cost management that bases project costs on the activities and processes that support them. It is also reengineering its energy-load-management system, which makes decisions about whether to buy or generate power. Within IS, Smith sees the need to move to a client/server development environment and implement CASE and object technologies.

While Smith and Dwyer believe that IS was well-suited to lead the TQM charge because of its process-oriented nature and tradition of project-team activity, they acknowledge that it took management's trust to open the door. CP&L's IS department "has not always been very effective," said Barham, "but we have some very strong people that began to see [our] vision and wanted to be part of it. We have some very good businesspeople in IS." CIO

TECHNICAL PROFILE

Carolina Power & Light Co., headquartered in Raleigh, N.C., provides electric power to almost a million customers in North and South Carolina. The 85-year-old company operates 16 power plants that use fossil, nuclear and hydroelectric resources to provide service to a 30,000-square-mile territory.

Large Systems: Four IBM 3090 mainframes running VM, MVS and CICS handle over 200 major, mostly proprietary business applications, including the customer-information management system, automated plant maintenance, corporate materials management, chemistry data management, and accounting and financials.

Mid-Range Systems: DEC VAXes at each plant handle primary plant-process monitoring and automatic substation switching, as well as engineering and scientific applications.

Desktop Systems: LANs running Banyan Vines support standard office automation throughout the company, as well as some small departmental applications. The company has approximately 6,000 desktop computers, about 75 percent of them Compaqs and the rest IBM and AST PCs and InterGraph engineering workstations. A wide area network connects the LANs and CP&L's service offices throughout the Carolinas.

Connectivity: CP&L has a fiber backbone and is currently developing multiprotocol inter-networking capabilities in order to connect all of its systems.

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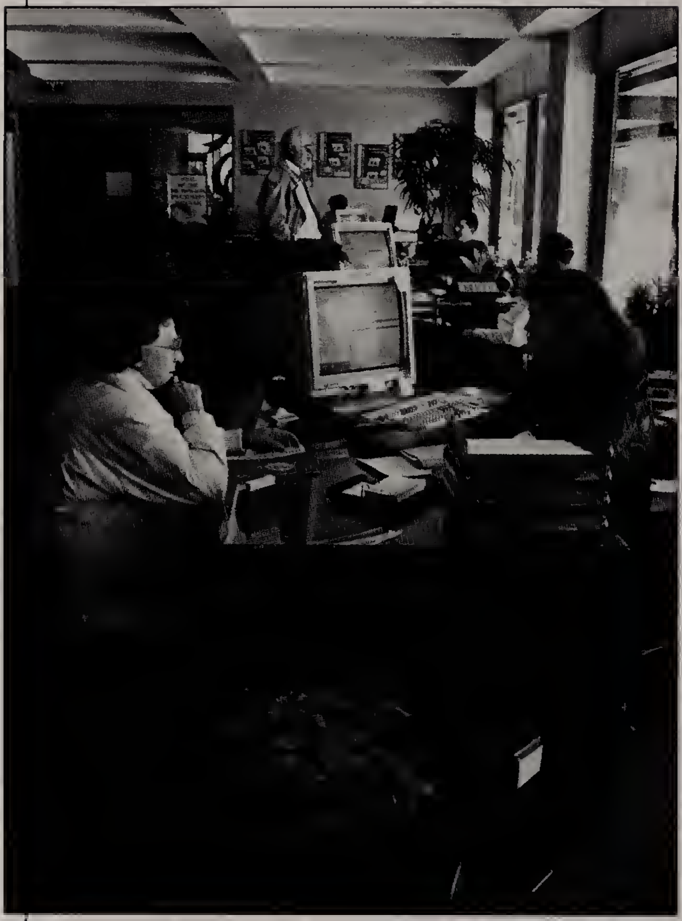


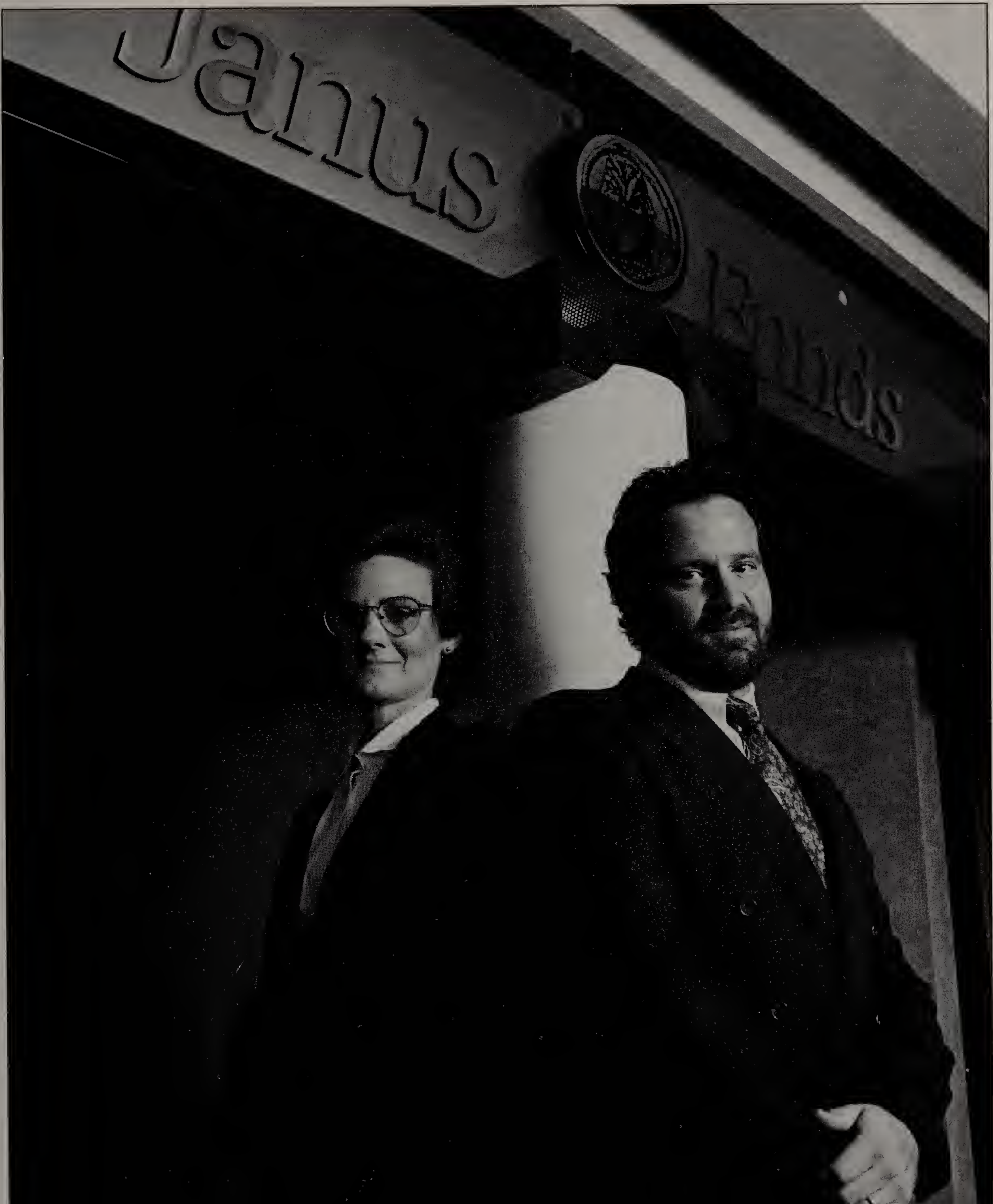
JANUS CAPITAL *had to keep operations at its customer-service center (above) functioning smoothly even while the company was in turmoil. Executives strongly believed that while fund performance brings in new customers, it is service that retains the old ones.* **MARGIE HURD** *and* **KEN CARPINELLO** *(right) struggled to maintain high service standards while putting out the daily fires sparked by unprecedented growth.*

They say character shines through in a crisis. For mutual fund vendor Janus Capital Corp., the crisis was a firestorm of unexpected new business ignited by its funds' excellent performance and fueled by investors' dissatisfaction with low-interest bank investments. In less than two years, Janus's investor accounts soared from 295,000 to 1.3 million in late 1992, with managed assets growing sixfold to $14 billion. Only a year earlier, IS was a one-man, part-time position at the Denver-based firm. But when the boom hit, it was IS that shielded Janus from the flames of runaway growth—in the process proving its worth and earning a spot as an integral member of the

BY RICHARD PASTORE

STORYLINE

In 1991, a mass influx of investors caught small mutual fund vendor Janus Capital Corp. by surprise. Millions of new dollars poured in. Phone-call volume doubled. Permanent staff members quadrupled. It could have been a customer-service disaster. But IS—until recently a one-man, part-time show—came to the rescue, sometimes working nightly to wire up every conceivable work space. The result: customer service emerged unscathed, and IS's reputation soared.



PHOTOGRAPHY BY ERNIE LEYBA

corporate team.

In late 1990, on the eve of the crisis, Ken Carpinello had only recently shed his part-time accounting duties to assume a full-time IS stewardship. He hired a handful of people to help tend a system of IBM 3270 dumb terminals linked to a host managed by outsourcing partner DST Systems in Kansas City, Mo. DST, which like Janus is a subsidiary of Kansas City Southern Railroads, took care of the mutual fund applications and the host that ran them. Carpinello had only to concern himself with maintaining adequate system-response times. It was the calm before the storm.

> "The hardest thing was just getting the equipment. We'd have 50 terminals shipped overnight, and then they'd come and tell us they found eight more spots to fill."
>
> *-Ken Carpinello*

Even before the massive infusion of new investor dollars began in 1991, customer service was emerging as a key differentiator among the many mutual fund marketers. Boston-based Fidelity, the industry's Goliath, had already begun pouring capital into its service infrastructure, completely redefining the relationship between the company and its customers, according to John Rekenthaler, editor of *Morningstar Mutual Funds*, a fund-watch newsletter. To compete in a market glutted with look-alike stock and bond funds, smaller mutual fund vendors like Janus were compelled to follow Fidelity's lead.

"Fund performance brings in new shareholders, but we have 1.3 million existing shareholders, and it's service that makes the difference in retaining them," said Margie Hurd, Carpinello's superior and executive vice president in charge of IS, customer service, training, human resources, quality control and other areas. New standards for customer service made it unacceptable to routinely put callers on hold. Phone reps needed to be more knowledgeable about products and investment nuances. Customer account questions required an answer immediately, not

The Benefits of Big

When business booms, even giants can be light on their feet

Like Janus, Fidelity and Vanguard raked in billions of dollars during the 1991-92 boom. But thanks to their size—the two firms are tops in fund sales to direct investors—and hefty IS budgets, coping with that growth proved relatively easy.

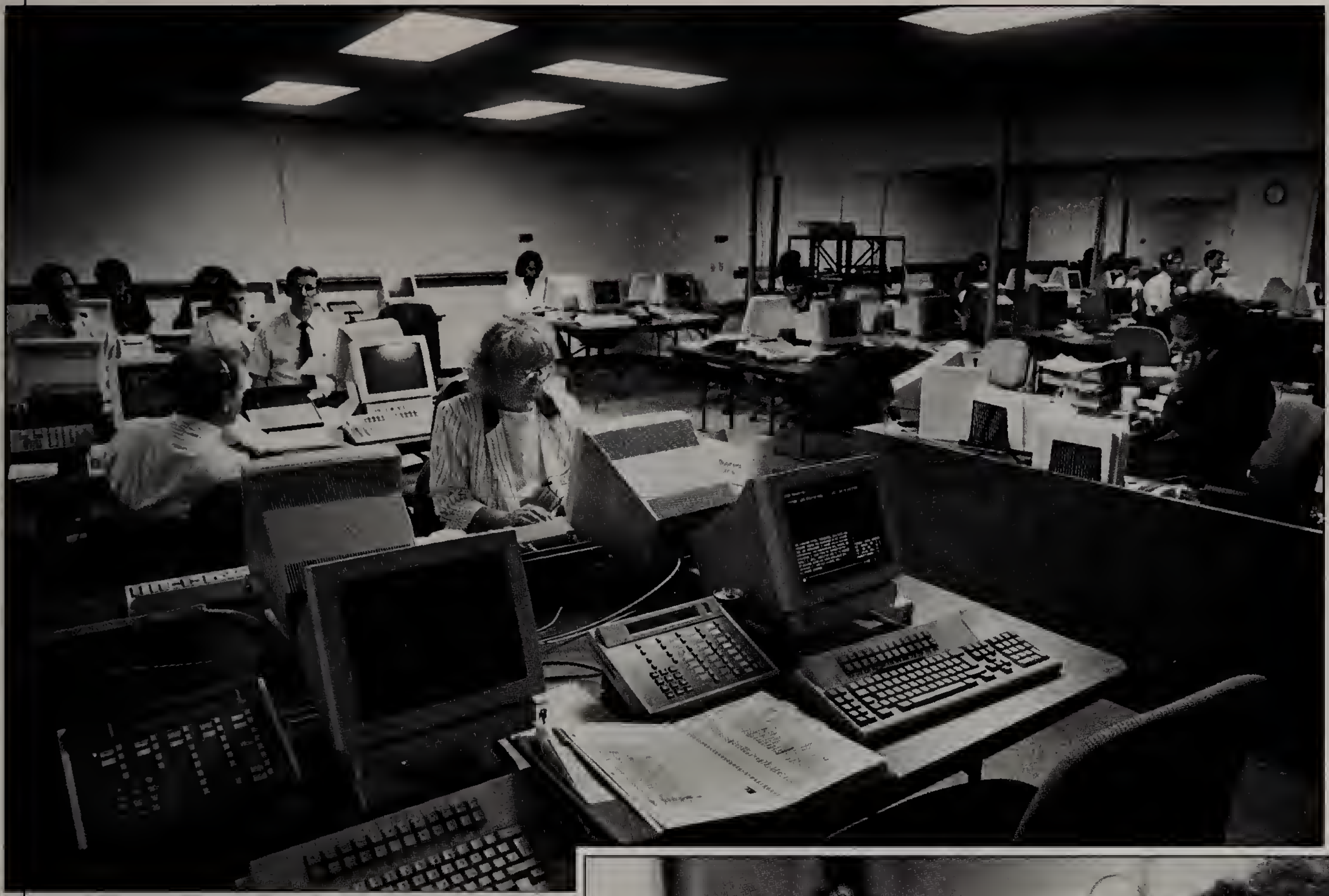
Boston-based Fidelity Investments Inc., which manages total investor and institutional assets of $185 billion, relies on pliant systems to see it through heavy-volume periods. "We were able to accommodate the increased volumes because we build systems and set up hardware with flexibility in mind," explained CIO Al Aiello. When customer-call volumes doubled in early 1992, Fidelity offloaded nonessential, statistical applications from brokers' PCs, in order to devote them to taking customer orders. Planned open-systems compliancy and a corporatewide network made the application swaps simple and quick.

In anticipation of high volumes, Fidelity also stress-tests its systems to gauge capacities. "We get to know where bottlenecks are and make sure they aren't below the hardware's maximum capability," Aiello said. That way the only constraint is the hardware itself, which can be easily upgraded with new memory or drives. (International Data Group, *CIO*'s parent company, has a business relationship with Fidelity.)

Growth rates of 35 percent over the last few years have been relatively painless for the Vanguard Group, a $95-billion-asset mutual-fund vendor in Valley Forge, Pa. "We can't control the volatility of our business, but we've done a tremendous amount of contingency planning," said Vice President of Information Technology Robert DiStefano. One such plan is rapid redeployment of support staff to man phones when call volumes rise. IS's contribution is a desktop just-in-time training system that brings redeployed staff up to speed faster than traditional training. The hypertext-based system provides access to all fund information, with menus that let redeployed workers drill down to the level of help they require—all while they handle calls.

DiStefano credits migration from dumb terminals to networked workstations for making such strategies possible. In that regard, Vanguard got a two-year jump on Janus—it now has 700 IBM OS/2-based PCs and clones installed and linked by an IBM token ring network. But even giants like Vanguard can be outflanked by technically aggressive little guys. While Janus has already redesigned document-research workflows around a new image system, Vanguard is just now considering a similar image overhaul for its back-office customer-service processing.

–R. Pastore



NEW-CUSTOMER VOLUMES *have eased, but the impetus to provide exceptional customer service has not. Janus reps are currently learning to navigate through a new document image system that will provide them with instant access to investor applications and fund documentation. The purchase would have been impossible without the increased revenues reaped during the high-growth period.*

> "Considering the size of the task, I think IS did an excellent job. They'd make great firefighters."
>
> *–Margie Hurd*

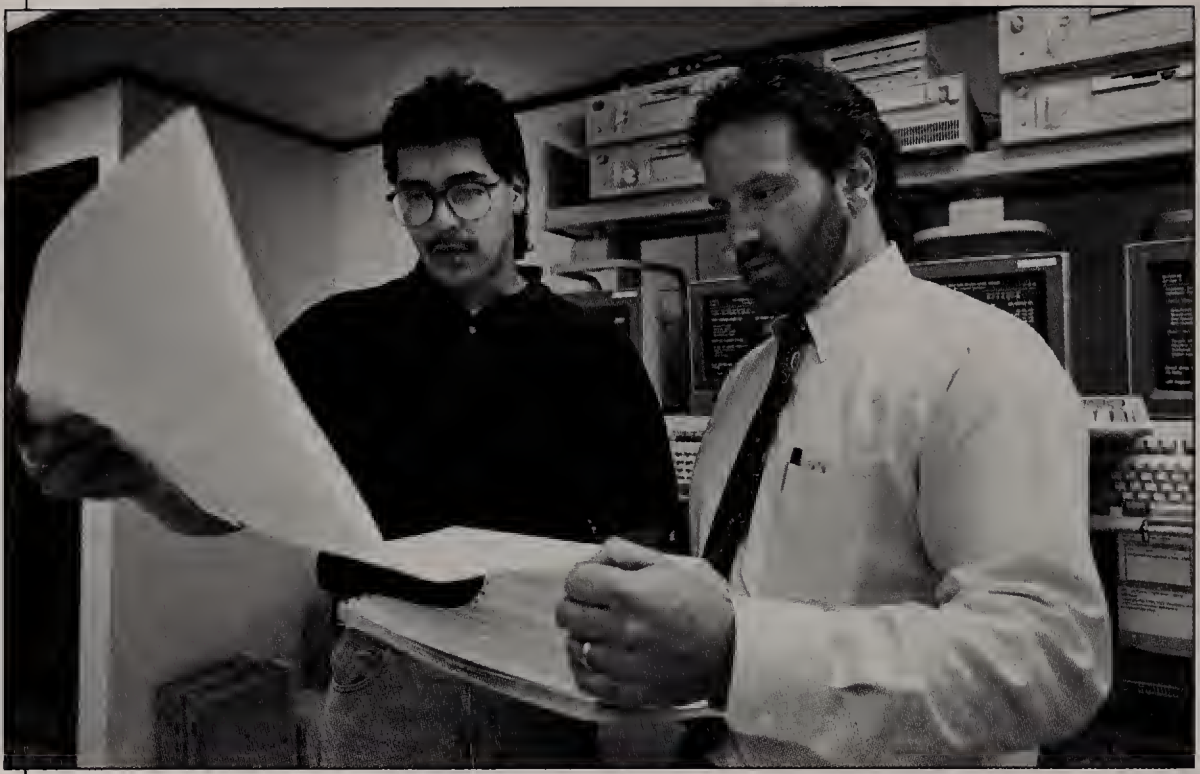
two days later as was once the norm.

With this heightened emphasis on customer service, the explosive growth of 1991-92 could well have been a customer-relations disaster for Janus. The mass influx of investors unhappy with dive-bombing CD interest rates caught the 124-person staff by surprise. Millions of new dollars poured in. Phone-call volume doubled. Permanent staffers were added at a rate that would quadruple the total by the end of 1992. "When we realized this was not going to stop, I called a meeting of all the managers and explained that we had to fill every conceivable space with a body," Hurd said. And it was up to IS to make those bodies hit the ground running.

Temporaries by the score were set up at folding tables in commandeered office space—the lunchroom, the aerobics room, even the board room was sacrificed for capacity. "The hardest thing was just getting the equipment," Carpinello said. "We'd have 50 terminals shipped overnight, and then they'd come and tell us they found eight more spots to fill." At the peak of the crisis, Carpinello's people were working nightly to drape cable across ceilings and down corridors to wire up every conceivable workplace. Meanwhile, to cope with the growth, outsourcer DST had to switch Janus's systems from a shared mainframe to a dedicated host.

Carpinello learned that Janus intended to push ahead as quickly as possible with a planned expansion into an additional Denver site, at the same time requiring a switch-over from dumb terminals to 400 networked, image-ready, OS/2-based workstations.

"I should have tried to indicate to upper management that this just wasn't going to work," he reflected. Instead, caught up in the can-do zeal



IS *is now in the mix right from the start.*

of the moment, he committed to a five-day schedule to fully install the first of three floors in the new 60,000-square-foot site. That window soon narrowed to a single weekend because of construction and furniture-shipment delays. The tight schedule, coupled with a lack of OS/2 competence on staff, doomed the effort. On the following Monday and Tuesday, staff installed in the new building had to move back to their old offices in order to do any work.

Despite the mishap, Janus was pleased overall with IS's contribution. "Considering the size of the task, I think they did an excellent job," said Hurd. "They'd make great firefighters." Customer service survived nearly unscathed, the low point coming in January 1992, when telephone hold times peaked at 70 seconds. Contrast that with Janus's closest rival, the $19.2-billion-asset 20th Century Investors of Kansas City. In early '92, callers had trouble getting through to 20th Century agents, and volume virtually "blew up the system," said editor Rekenthaler. To correct the situation, 20th Century doubled its number of phone lines and agents over three months, a spokesman said.

Janus's IS group not only survived, it emerged as a stronger and more respected corporate team player. "Every part of the company has a role to contribute, but systems availability is at the heart of it," Hurd said. IS is now 25 strong and commands a budget second only to corporate payroll. More important was the corporate/IS mind-shift from reactive to proactive."Where we used to be called in to put out fires, now we're involved up-front in planning for our future," Carpinello said. With IS in the mix right from the start, there's less chance for the surprises and unrealistic expectations that predominated during the growth surge, he noted. "Communication has improved tremendously."

That doesn't mean Carpinello's job is any easier now that new-customer volumes have eased. Initiatives shoved aside during the crisis now command his attention. For example, Carpinello is looking hard for management software that will monitor and diagnose any problems afflicting Janus's 550-node network.

> "Where we used to be called in to put out fires, now we're involved up-front in planning for our future."

The firm's single most significant and costly IS initiative is a document image system that will provide phone reps with instant access to investor applications and fund documentation. With these documents electronically at hand, Janus expects to answer 98 percent of customer queries during the initial call. Previously, questions requiring microfilm-document research took two to three days to turn around. Although the system is fully rolled out, its learning curve remains lengthy. Because of the newness of OS/2 and the workflow redesigns required by imaging, it will be a year before everyone is comfortable with the system, Carpinello predicted.

The system has also proven very expensive, despite the fact that sister firm DST provided the image and workflow software. The purchase would have been impossible without the increased revenues reaped during the high-growth period, Hurd said. Nevertheless, Janus needs the system to keep up with the Fidelitys of the world and to better accommodate the now-steady customer growth. But should business ever explode again, Carpinello and his IS firefighting team stand ready to leap to the rescue once more. CIO

TECHNICAL PROFILE

Janus Capital Corp. of Denver, is a mutual fund vendor with managed assets of $14 billion.

Host Hardware: Off-site dedicated host operated by DST Systems Inc. of Kansas City, Mo.

Client Hardware: 400 IBM OS/2-based workstations networked to five Novell Inc. Netware servers via token ring. One IBM AS/400 Model E80 used as an image file server. 150 DOS-based PCs running nonimage applications.

Principal Software: Mutual fund order-processing and accounting systems, administered by DST Systems, run on an off-site host. Newly acquired DST document-imaging and automated-workflow software, which runs on AS/400 and OS/2 PCs.

ADVERTISEMENT

Send Three and Sixpence We're Going to a Dance

by Scott McCready

As the old British joke goes, a daring group of soldiers during World War 1 sent an urgent message to Group HQ, "Send reinforcements we're going to advance." The message was subsequently passed from person to person down the trenches until it reached HQ. At that point it was interpreted as "Send three and sixpence we're going to a dance."

As the advocates of reengineering rapidly form ranks, we hear a great deal about the glory, but very little about the challenges or risks associated with re-engineering. However, even the simple task of getting senior management directives correctly interpreted in the trenches of the workplace can be problematic. Reengineering is useful as a rallying cry for US business that "all is not well." However, the re-engineering banner, while flying high, may not be the appropriate regiment to bet the life of your company on.

Re-engineering all too often plays on the adages of old, i.e., there is an optimal business process or structure, and you cannot automate an activity that resists definition.

Welcome to the world of workflow — in which there is no ultimate process or structure except the ability to re-configure processing resources in real-time, and there is something better than simply tools to cope with the "undefinable process". What workflow software provides is a general set of tools that are flexible enough to manage a wide range of business objects and processes — sort of an "open computer-integrated manufacturing environment."

If you're a senior manager whose voice may be heard but not always correctly interpreted within the trenches, plan on attending Workflow '93: Turning Point.

For more information call 1-800-343-4952.

McCready is a principal at IDC/Avante Technologies, a market research firm in Framingham, Mass. The company recently completed a 1200 page report on workflow software entitled, "Workflow Software: Challenge for the 1990s."

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Golden Retrievers

Lack of storage space, unenforceable filing procedures and inadequate indexing schemes are making electronic records as cumbersome as their paper precursors. Fortunately, a slew of document-management tools is putting information back at people's fingertips.

BY LUCIE JUNEAU

An organization's survival can hinge on its ability to leverage information effectively. A good chunk of any company's information base—the grist that keeps its corporate mill humming—resides in its documents. As more and more of this information is created and stored electronically, corporations need to invest in powerful document-management tools.

On average, 25 percent of all general office information is stored electronically, according to a survey conducted by the Gartner Group, an IT research firm based in Stamford, Conn. Fifty percent of such information will be stored in digital form by 1996, and 13 percent of respondents said they expect to have more than 70 percent of their office information online by that time.

As the amount of electronic information mushrooms, the problems that have historically hampered paper-based record-management systems begin to cripple electronic systems as well: inadequate storage space; cumbersome, unenforceable filing and retrieval procedures; and inadequate indexing schemes, to name just a few. In the worst cases, improperly filed electronic documents—like misfiled paper documents—may be lost in limbo indefinitely.

What companies need are efficient automated procedures for filing, indexing, archiving and retrieving documents and, in many cases, for controlling access to documents and managing their progress through the workplace. Document-management systems offer the appropriate tools.

The movement to local area networks has increased the need for such tools, experts say. Unlike mainframes, LANs don't include efficient, centralized, library-like facilities. And while they provide an infrastructure for improved document-sharing and -management, LANs don't have all the features users need to exploit that infrastructure.

The advent of LANs promised to make information that had previously been stored on standalone PCs more widely available, and workgroup computing a reality. But that hasn't happened, according to James Popkin, program director of the Gartner Group's office information systems service. Instead, many organizations have been lulled into thinking they're in control of their data, when in fact they aren't. A recent study by the 3M company of 800 power users in corporate America indicated that 80 percent of data in network environments is stored on local hard drives. This supports the view that most corporate information is beyond the reach of the user community.

Document-management tools can make data on the network readily accessible to those who can use it. Typically client/server-oriented, these systems help ensure that users store business-critical documents in a centralized library on the server rather

ILLUSTRATION BY WARREN GEBERT

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than in their own file systems—possibly the single most important benefit of these tools.

The kind of document-management package a company needs depends on its existing technology and applications and, more importantly, on the nature and volume of its documents. Traditionally, the term "document management" has referred to electronically created computer files. Products that manage images originating on paper and later scanned into an electronic system have fallen under the heading of image management. In the broadest sense, however, document management encompasses both.

To some extent, image and document management (as traditionally defined) are beginning to overlap. Thanks to the growing use of scanning technology, many companies need a system that can manage both electronically created documents and those created on paper. And vendors whose products have managed only electronically created documents in the past are beginning to offer image-management features as part of their standard packages or as options.

One product that has already moved in that direction is SoftSolutions, from SoftSolutions Technology Corp., which offers an optional add-on package called Image Manager. Conversely, some products with roots in the imaging world, including Keyfile Corp.'s Keyfile, now offer some features more commonly associated with traditional document management.

Corporations that handle a lot of scanned-in data need packages especially designed for high-volume image management. Credit-card and insurance companies, for example, are likely to require heavy-duty packages such as WorkFlo Business System software, from FileNet Corp., or ViewStar Corp.'s ViewStar to process the tremendous number of payments or claims coming into their systems. These packages provide capabilities such as workflow control, a feature that helps route incoming documents appropriately, to speed up their processing. They also control access to documents and manage archiving to help reduce storage requirements. (Image files are notorious disk-space guzzlers.)

> *The advent of LANs promised to make workgroup computing a reality. But that hasn't happened.*

Engineering companies can turn to a subset of the image-management field called engineering-document management (EDM). Vendors providing EDM solutions include Cimage Corp., of Ann Arbor, Mich., and Formtek Inc., of Pittsburgh. Another specialty, product-data management (PDM), was developed to manage data generated via computer-aided design (CAD). One leading vendor in this area is Sherpa Corp., of San Jose, Calif. Not surprisingly, the features offered by EDM and PDM systems tend to overlap.

Many of the document-management packages that handle electronically generated data—including the popular PC DOCS from PC DOCS Inc., SoftSolutions and Document Administrator from Information Management Research Inc.—were designed to serve the needs of the legal profession. Today they appeal to a variety of companies whose documents are considered mission-critical. On the most basic level, such packages function as electronic "libraries," providing a repository for electronic data, with check-in features for filing information and check-out features for retrieving it. In addition, they usually include version and revision control, accounting/billing control and archiving capabilities.

To enhance ease of use, these systems are tightly integrated with word-processing applications such as WordPerfect. When a user saves a file using the usual WordPerfect command, he or she may be asked to fill in a profile—a kind of electronic index card that includes key information that can be used to index and later locate the file. The profile might include the author's name and a document number and/or name, for example. Some fields in the profile—say, the date the file was edited or created—are typically filled in by the program automatically.

These profiles are stored in shared databases that generally reside on the network server. Increasingly, document-management packages are built on relational databases such as Oracle or Ingres and provide the ability to tie in with any structured query language (SQL) database. The database is used to manage document indexes and includes a profile for each document in the system. Some packages, such as SoftSolutions, allow users to link databases on multiple LANs, so that users can conduct enterprisewide document searches.

In addition to allowing searches based on profile information, many packages offer the ability to conduct full-text searches. Users may typically search for particular words or phrases and narrow their searches by incorporating Boolean logic (specifying "and," "or" or "not" relationships). For example, a user might search for all documents including the phrase "company picnic" *and* the word "events". The user could then locate documents detailing the day's activities, bypassing other documents concerning the outing but unrelated to the user's immediate interests.

Document-management packages that include particularly sophisticated text-retrieval capabilities may also support conceptual searching, a thesaurus-like feature allowing users to locate conceptually related documents. SoftSolutions offers a conceptual, intelligent-search capability through an add-on product. And ConQuest, from Conquest Software, incorporates a semantic network of 250,000 concepts derived from dictionaries and thesauri. The product can even account for words with multiple meanings, distinguishing between a failed savings-and-loan bank and an eroding river bank.

To the extent that document-management packages incorporate extensive search capabilities, they overlap with traditional text-retrieval packages such as Verity (as of press time, Verity was in the process of being acquired by Frame Technology Inc.). Some products, such as PC DOCS, speed retrieval time by allowing users to search recently accessed files before conducting a broader search.

Many organizations find that accounting/billing-, version- and revision-control features are indispensable. Accounting/billing control keeps track of how much time a user has spent editing or viewing a file and can be used to bill clients or departments. Version-control features can help organizations keep track of multiple file versions (a series of contract iterations, for example). Revision-control features—which can assign users a variety of privilege levels—protect document information and ensure that it isn't erroneously superseded. For example, if two users pull identical copies of a document from the server and proceed to make changes, one user's changes could potentially be overwritten when the second user saves his or her revisions. An organization might therefore decide to restrict deletion and revision privileges to the author, while providing others with the ability to review or comment on the document.

Document-management packages can also provide automatic archiving or deletion of material. Typically, documents are archived to less expensive media such as tape or optical drives, but they are retained in the library system for quick retrieval.

In addition to their application in horizontal business environments, these systems are used in environments where document production is a primary activity. Packages addressing this market include publishing heavyweight Interleaf Inc.'s Interleaf RDM document-management system and BOSS Logic Inc.'s BOSS Document Manager. Products like RDM and BOSS provide sophisticated features to help coordinate and leverage information. RDM, for example, includes a feature that Interleaf refers to as "configuration management": As key data files are changed, authors with documents reflecting that data are notified so that they can update their files as well. BOSS's "active document management" provides similar capabilities.

Facilitating access to information is the raison d'etre of document management.

High-end document-management packages such as RDM and BOSS also tend to incorporate workflow features similar to those found in many image-management environments. In a typical high-volume image-management application, an insurance company's health claims could be scanned into the system and then appropriately routed. A claim could be sent to the queue that is least full, for instance, helping to distribute the workload evenly.

In the document-manufacturing area, workflow software is used to manage the assembly of very large, often compound documents. Rules and instructions are defined that automate the logistics of document manufacturing. The application can incorporate a dialogue box with items that each user must check off before the document can be routed to the next station. Before any workflow system can be implemented, however, someone must develop the appropriate routing logic. This often involves some reengineering of existing business processes.

When selecting a solution, information managers must make sure they're not paying for functionality they don't need. According to the Gartner Group's Popkin, an organization that manages electronically created documents and occasionally views image files in a general office environment can get by with a relatively modest package that includes some imaging capabilities. But a corporation engaged in scanning and processing 15,000 forms a day will be looking for a high-end image-management product. And a company whose operations involve heavy document production will need a product designed primarily for high-volume management of electronically created documents.

Information executives who are considering implementing imaging systems might want to investigate alternate methods of accomplishing their goals before they invest, said Jerry Michalski, contributing editor for *Release 1.0*, a PC industry newsletter based in New York. Networks must be carefully tuned to accommodate the demands of large images, which require substantial bandwidth. And at least for the next five years, managers should act on the assumption that bandwidth will be expensive, Michalski said.

Companies that handle only a small volume of mission-critical documents may want to postpone investing in any document-management solution. Eventually, word-processing packages are expected to incorporate popular document-management features, according to Joanne Correia, program manager for workgroup applications systems at International Data Corp. in Framingham, Mass. In addition, some document-management features are migrating down to the level of network operating systems, and LAN vendors like Microsoft, Novell and Apple may soon provide better network document-management capabilities than they do now.

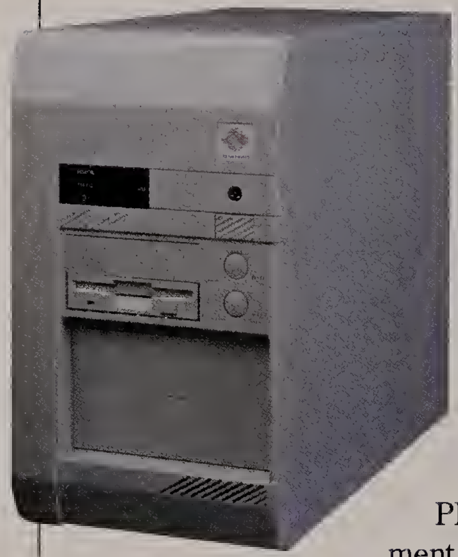
Among document-management packages of all stripes, the biggest trend today is the movement to provide users with the flexibility to work with many document formats and applications and within a variety of network environments. That's a very welcome development for companies struggling to gain more control over a critical and elusive resource—the wealth of information at their fingertips.

Lucie Juneau is a freelance writer based in Salem, Mass.

FYI

Reach Out and Trap Someone

Telephone fraud comes in many shapes and sizes. Credit-card holders have learned to look over their shoulders while using pay phones. For corporations the stakes are much higher: Business losses from telephone fraud are estimated at $4 billion per year. And companies with a typical PBX phone system have a one-in-18 chance of being hacked, with an average loss per hack of $60,000.



Xiox Corp.'s new Fort Knox products address the concerns of telecom managers who want to stop hackers while allowing full use of PBX features. Using artificial intelligence, the products distinguish between authorized and unauthorized phone use. The Hacker Preventer ($10,000 to $28,000, depending on system size) is an automated, intelligent system that cuts off access when it senses deviations from "normal" usage. The Hacker Tracker ($2,195) is a recording and reporting system for tracking and trapping hackers. And the Hacker Deadbolt ($1,295) provides protection for remote maintenance and testing ports of a PBX, voice-mail system and other customer-premises equipment. For more information call 415 375-8188.

Roving Reporter

Yes, we want computing portability, but no, we don't want to be isolated from the network and central data processing. Helping to solve this dilemma are products like RangeLAN/PCMCIA, a wireless local-area network adapter that grants free agents network access from as far away as 800 feet. Proxim Inc. designed the $595 device for portables and pen machines equipped with Type II PCMCIA "credit card"-style slots.

The wireless link uses spread-spectrum technology to allow portables to function as network nodes without any cable connections. For example, dock workers who use pen computers to log shipments inside tractor trailers can now have a live link to the corporate network. The spectrum conduit can pass data at 242K bits per second across a span of 800 feet or less.

The product, which was set to ship in January, has been demonstrated publicly on portables from GRiD Systems Corp. and Zenith Data Systems. It supports most popular LAN operating systems, according to the company. Proxim can be reached at 415 960-1630.

A New View of Togetherness

Microsoft Corp. is putting its software muscle behind the concept of teamwork. With the release of its Windows for Workgroups operating system, the company aims to make it easy for people to share information and work together.

Windows for Workgroups integrates networking and workgroup functionality directly into the Windows 3.1 operating system. Networking activities handled by the product include sending E-mail, scheduling group meetings, sharing files and printers, managing calendars and collaborating on group projects. According to Microsoft, the product can provide networking capabilities on its own, or it can be used as a client on an existing local area network.

At least 40 computer manufacturers, including Compaq and Hewlett-Packard, will preinstall the product on their machines, and more than 100 hardware and software vendors offer compatible products. Suggested retail prices range from $79.95 to $849.95, depending on configuration. (Several software-only configurations provide an upgrade for Windows 3.0 and 3.1 and MS-DOS; other configurations include everything from software to network cards and cables.) For more information call 206 862-8080.

Perpetual Connection

You can run, but you can't hide. Today that's truer than ever. In its standalone mode, Motorola's new wireless modem/pager, InfoTAC, automatically acknowledges messages, giving the sender immediate proof of delivery. The user can reply using customized response prompts. The unit receives files, database transactions and other data as well, and the data can be saved, deleted or uploaded to the user's computer.

When connected to any laptop, notebook or pen-based computer via the standard RS-232 port connection, InfoTAC is a full-function radio-packet modem. It has two software interfaces: transparent mode, which utilizes an industry-standard AT command set for using standard communications packages, and native mode, which provides a more comprehensive DTE interface for RF-optimized applications.

InfoTAC supports a variety of packet radio protocols. It can be operated on both private and select public data communications networks and sells for $1,350. For more information, call 708 576-1000.

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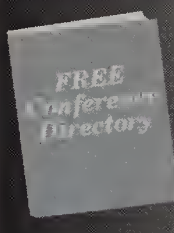

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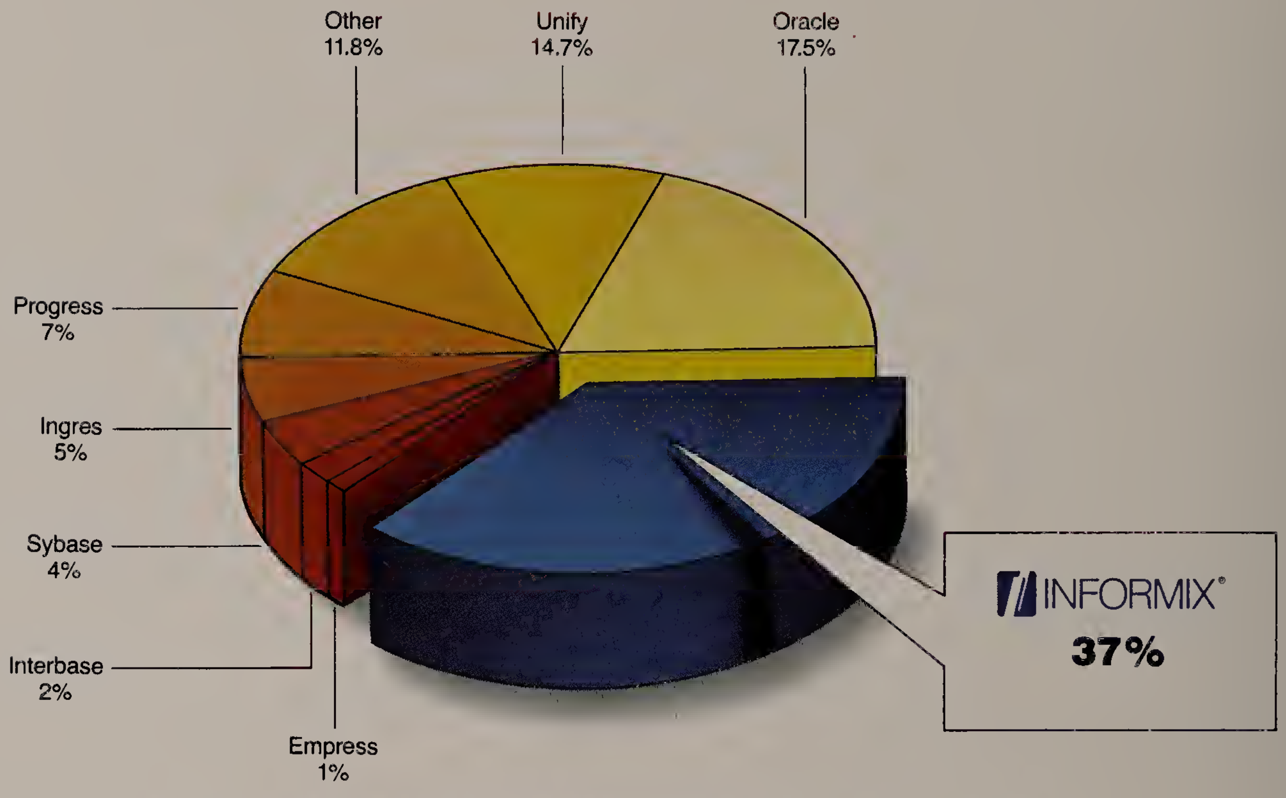

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